

**INJ. PUMP CALIBRATION DATA**

ENGINE MODEL 4D31T

BOSCH No. 9 400 610 056 1/6  
 DKKC No. 101401-1121  
 Date: 30.May.1987  
 Company: MITSUBISHI  
 No. ME016321

Injection pump : PES4A Governor : EP/RLD-E Timing device : EP/SCDM  
 101040-9280 105921-1171 105676-0250

**1. Test Conditions :**

Pump rotation : clockwiseviewed from drive side  
 Nozzle & Nozzle Holder Ass'y : 105780-8140 Nozzle Holder : 105780-2080  
 (BOSCH Type No. EF8511/9A) (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>  
 Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm  
 Test Oil : ISO4113 or SAE Standard Test Oil(SAE J967d) Oil Temp. : 40<sup>+5</sup> °C  
 Overflow valve opening pressure : 2.6 Kg/cm<sup>2</sup> (Part No. 131424-6220 )

**2. Injection Timing :**

Pre-stroke : No. 1 Plunger 3.6 ±0.05mm  
 Note : Adjust with control rod position of mm  
 Injection order : 1 90°±30' 3, 1 180°±30' 4, 1 270°±30' 2 (interval : \*±30')  
 Plungers are numbered from the Drive side.  
 Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.  
 : Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

**4. Injection Quantity :**

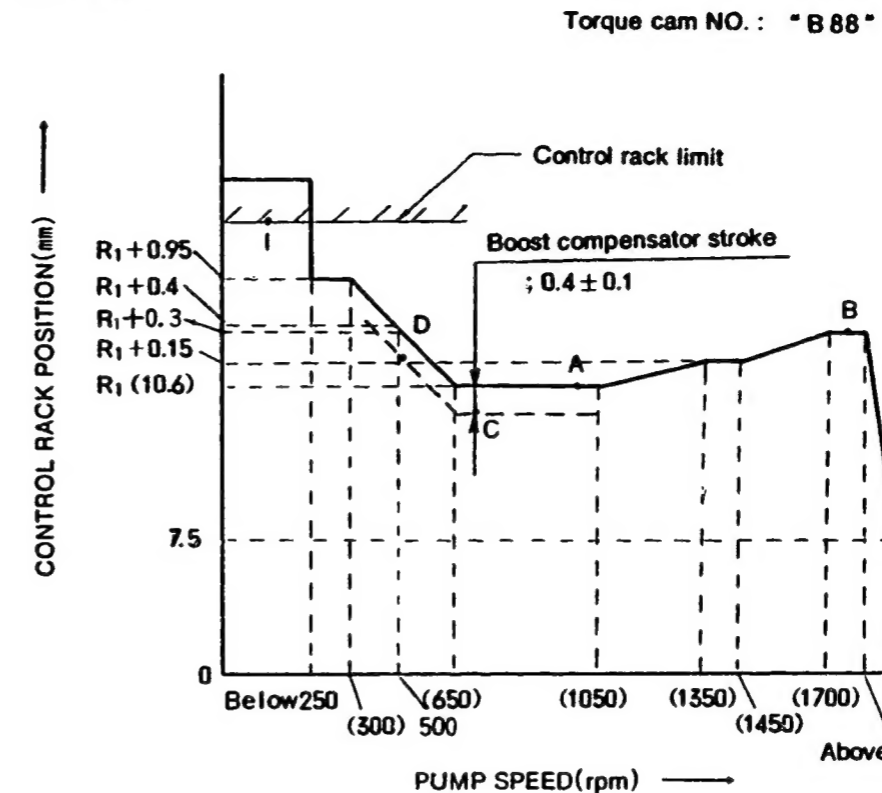
Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	10.6	1,000	54.1 ~ 56.1	±2.5	Rack	Basic
H	Approx. 9.5	325	8.7 ~ 11.3	±10	Rack	
A	R (10.6)	1,000	54.1 ~ 56.1	-	Lever	Basic Boost press. Above320mmHg
B	R+0.3	1,750	69.0 ~ 73.0	-	Lever	Boost press. Above320mmHg
C	R <sub>2</sub> (R-0.4)	700	(37.9 ~ 41.9)	-	Lever	
D	R+0.4	500	(33.7 ~ 37.7)	-	Lever	
I	-	100	67.0 ~ 72.0	-	Lever	Control rack limit

**5. Timing Advance Specification :**

Pump Speed (r.p.m)	1,450	1,700
Advance Angle (deg.)	Start	Finish 3.0~4.0

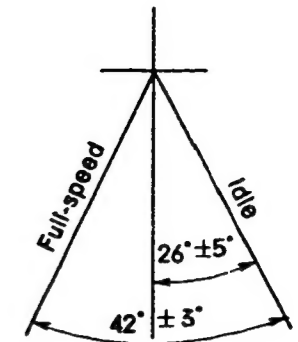
**3. GOVERNOR ADJUSTMENT**

(1) Full speed

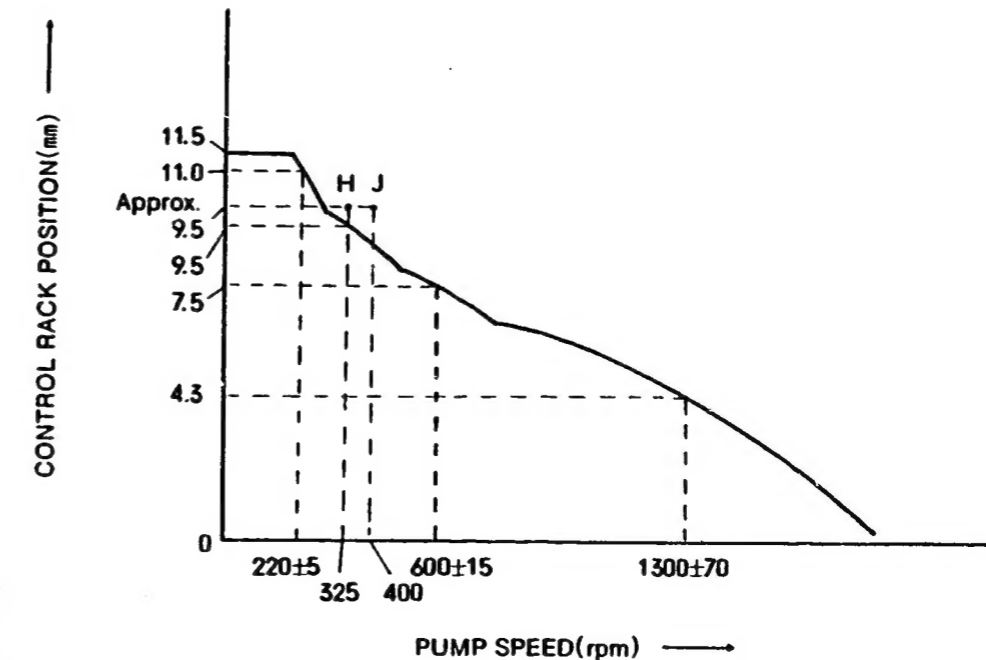


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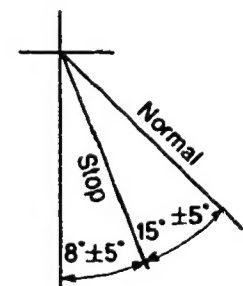
Control lever angle

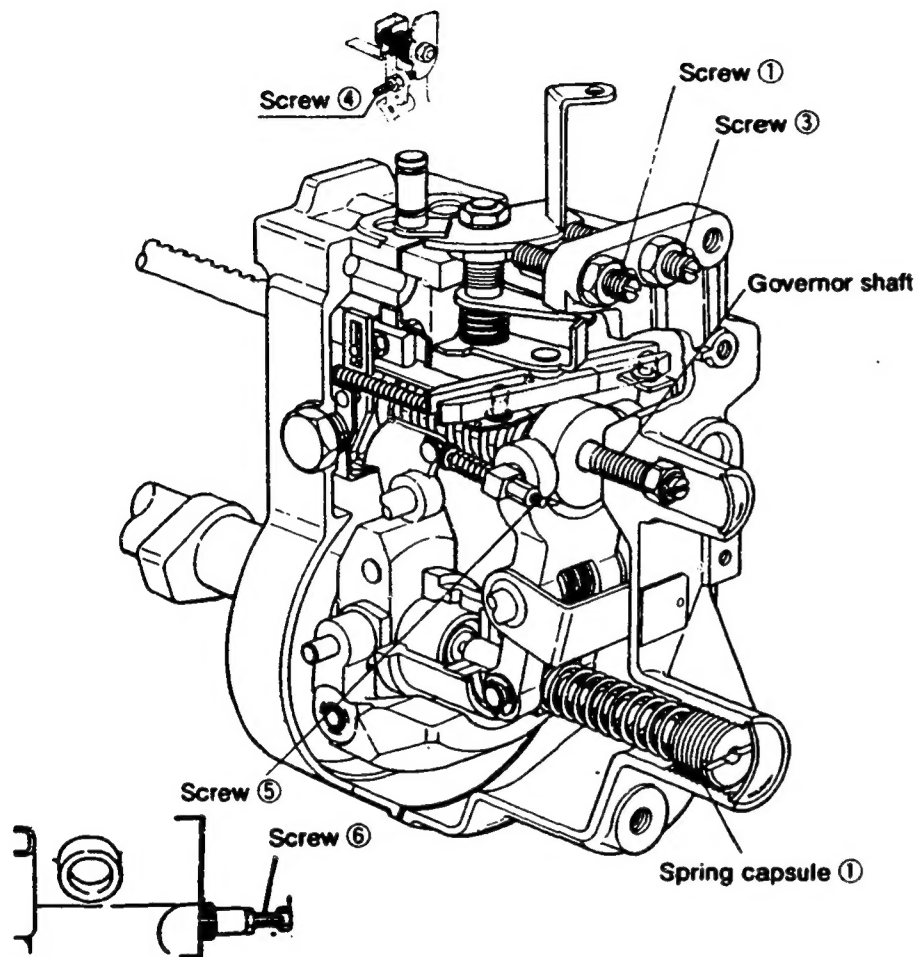


(2) Idling



Stop lever angle





■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	215~225	11.0	• Adjust using spring capsule ①. • Adjust shim ① inside the spring capsule.
	325	9.5	
Governor Spring Contact Adjustment	585~615	7.5	• Adjust the governor shaft position.
	1230~1370	4.3	• Confirm
Setting the Idling Lever Position	325	Approx.9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle (21°~31°)

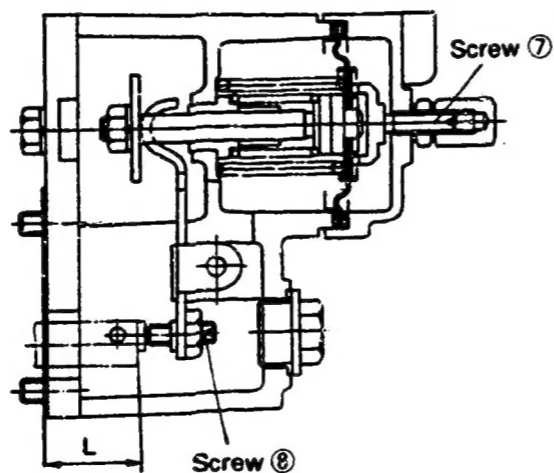
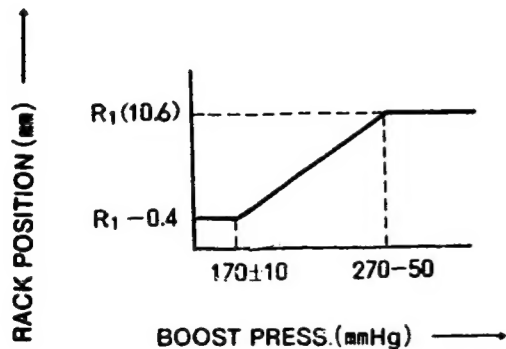
■ Full Load Adjustment (Torque Cam No. B88)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	Approx.1750	$R_1+0.3$	• Adjust using screw ③. (Do not enter governor control range)
Full Load Position Adjustment	1000	$R_1(10.6)$	• Adjust using screw ④.
Torque Cam Position Adjustment	500	$R_1+0.4$	• Adjust using screw ⑤.
	(300)	$R_1+0.95$	• Confirm
	(650)	$R_1(10.6)$	• Confirm
	(1050)	$R_1(10.6)$	• Confirm
	(1350)	$R_1+0.15$	• Confirm
	(1450)	$R_1+0.15$	• Confirm
	(1700)	$R_1+0.3$	• Confirm
	—	—	• Confirm
	—	—	• Confirm
	Confirm injection quantity at point A.		
Maximum Speed control Adjustment	Above1750	$R_1+0.3$	• Adjust using screw ③.
	$1900\pm 10$	7.5	• Confirm • After adjustment, confirm that the control lever angle is 39°~45°.
Confirming Excess Fuel Limit for Engine Starting	400	Approx.9.5	• Set the control lever at point J.
	0	11.5	• Confirm
	0	Above $R_1+0.95$	• Move the control lever to the "full-speed" position and then confirm the control rack position.
Confirm the Black Smoke Limit	Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond $R_1+0.95$ mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 300 rpm.		
Rack Limiter Adjustment	• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is 62~72 cc/1000st.		
	Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I.		

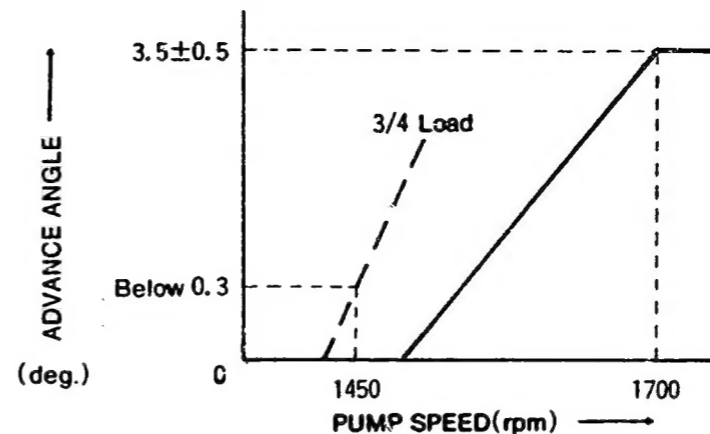
■ Boost Compensator Adjustment

- Maintain the pump speed at 700 rpm and fix the control lever in the full load position.
- In this condition, use calipers to measure the dimension "L" of the pushrod from the end face of the spacer. (Inspection: 23.5 to 24.5 mm)

Item	Boost press. (mmHg)	Rack Position (mm)	Remarks
Setting the Boost Compensator Spring Force	160~180	R <sub>1</sub> -0.4	• Adjust using screw ⑦.
Boost Compensator Spring Adjustment (Boost compensator stroke: 0.4±0.1 mm)	0	R <sub>1</sub> -0.4	• Adjust using screw ⑧.
	160~180 220~320	R <sub>1</sub> -0.4 R <sub>1</sub> (10.6)	• Confirm • Confirm



5. Timing Advance Specification :

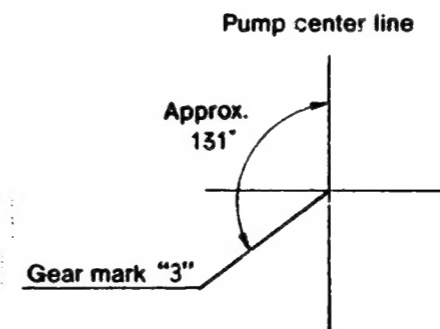


<Note>

1. Run the pump at 1450 rpm and fix the control lever when the fuel injection quantity obtained is approx.44 cc/1000st.
2. Confirm that the timing advance angle is less than 0.3°.

■ Timing Setting

At No. 1 plunger's beginning of injection position.  
B.D.T.C. : 11°



**INJ. PUMP CALIBRATION DATA**

ENGINE MODEL 4D31T

BOSCH No.9 400 510 057 1/7  
 DKKC No. 101401-1150  
 Date: 30.May.1987 ①  
 Company: MITSUBISHI  
 No. ME016341

Injection pump : PES4A 101040-9320 Governor : EP/RLD-E 105921-1741 Timing device : EP/SCDM 105676-0250

**1. Test Conditions :**

Pump rotation : clockwiseviewed from drive side  
 Nozzle & Nozzle Holder Ass'y : 105780-8140 (BOSCH Type No. EF8511/9A) Nozzle Holder : 105780-2080 (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>  
 Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm  
 Test Oil : ISO4113 or SAE Standard Test Oil(SAE J967d) Oil Temp. : 40<sup>±5</sup>°C  
 Overflow valve opening pressure : 2.6 Kg/cm<sup>2</sup> (Part No. 131424-6220 )

**2. Injection Timing :**

Pre-stroke : No. 1 Plunger 3.6 ±0.05mm  
 Note : Adjust with control rod position of mm  
 injection order : 1  $90^{\circ} \pm 30'$  3, 1  $180^{\circ} \pm 30'$  4, 1  $270^{\circ} \pm 30'$  2 (interval :  $^{\circ} \pm 30'$ )  
 Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.  
 : Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

**4. Injection Quantity :**

Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	10.6	1,000	54.1 ~ 56.1	±2.5	Rack	Basic
H	Approx. 9.5	325	8.7 ~ 11.3	±10	Rack	
A	R <sub>1</sub> (10.6)	1,000	54.1 ~ 56.1	-	Lever	Basic Boost press. Above 320mmHg
B	R <sub>1</sub> +0.3	1,750	(69.0 ~ 73.0)	-	Lever	Boost press. Above 320mmHg
C	R <sub>1</sub> (R <sub>1</sub> -0.4)	700	(37.9 ~ 41.9)	-	Lever	Boost press.0
D	R <sub>1</sub> +0.4	500	(33.7 ~ 37.7)	-	Lever	Boost press.0
I	-	100	67.0 ~ 72.0	-	Lever	Control rack limit

**5. Timing Advance Specification :**

Pump Speed (r.p.m)	Advance Angle (deg.)

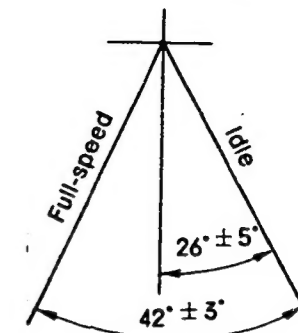
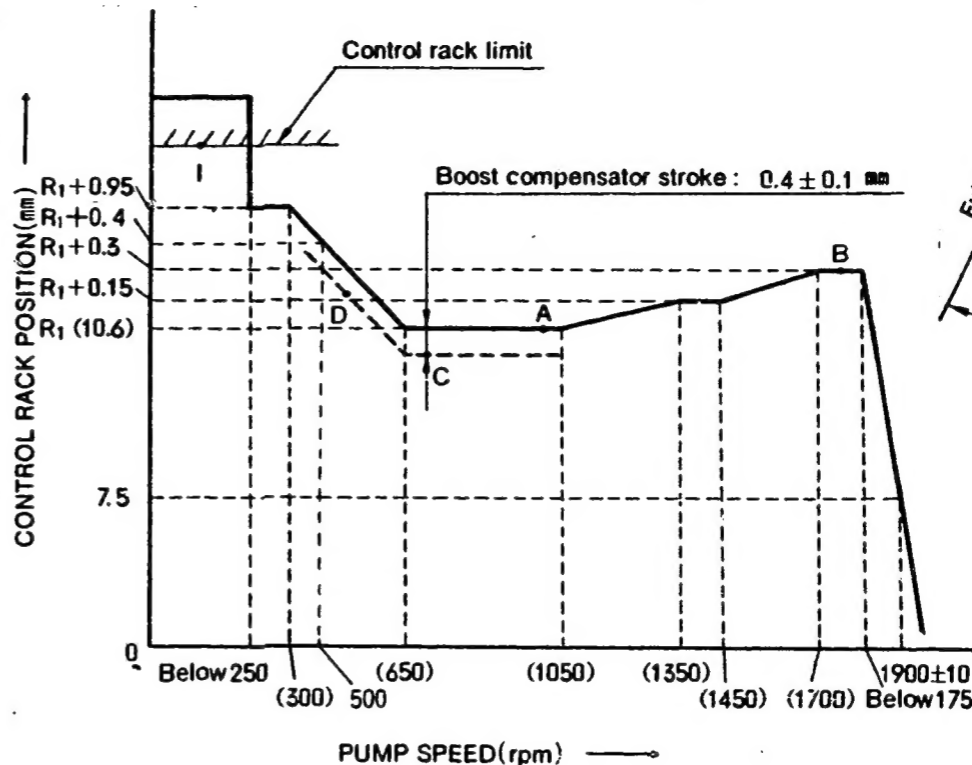
**3. GOVERNOR ADJUSTMENT**

(1) Full speed

Torque cam No.: "B88"

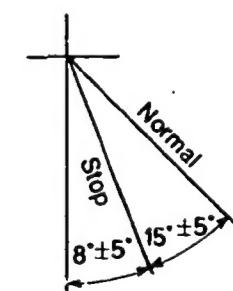
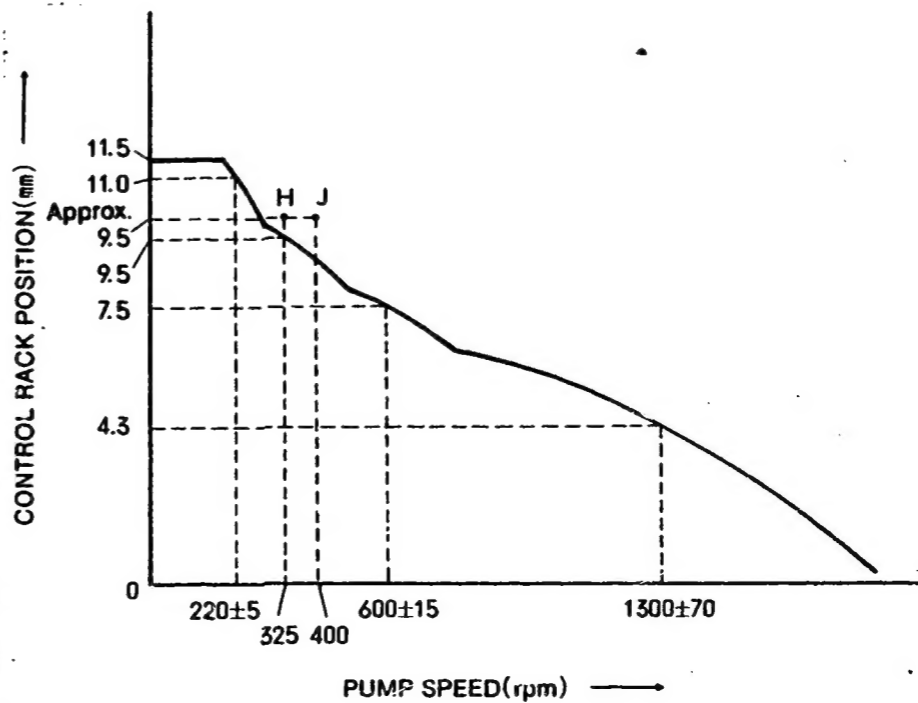
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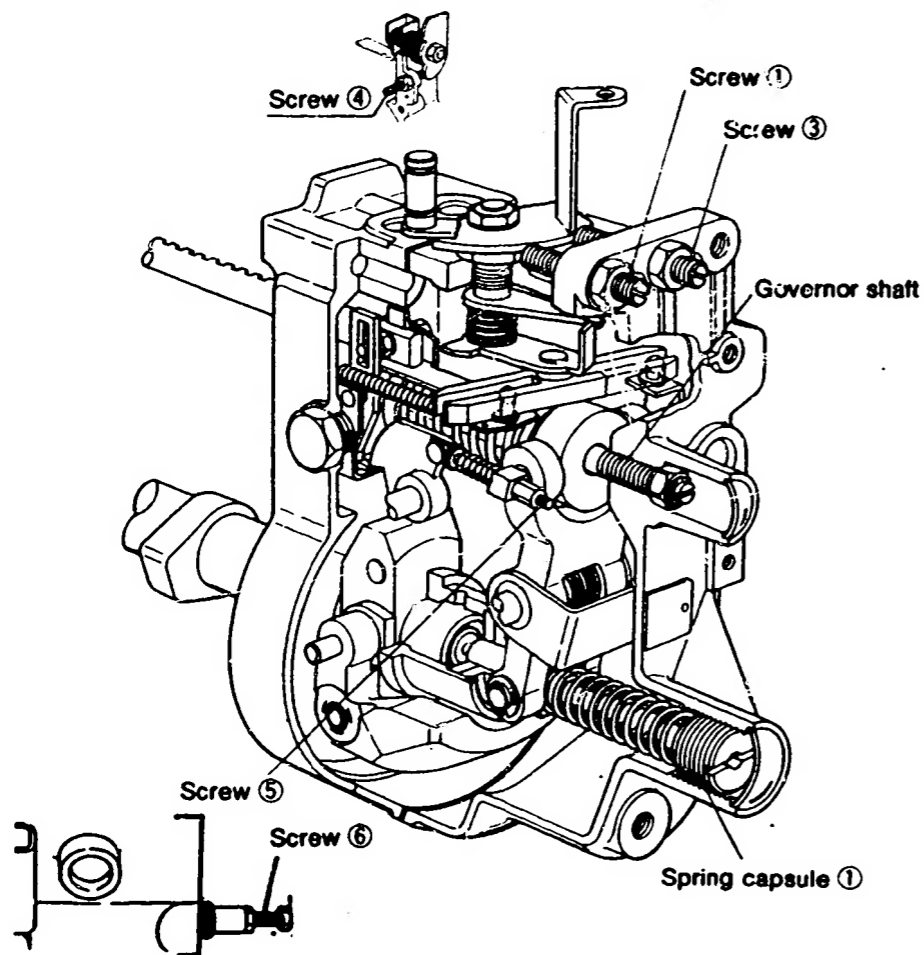
Control lever angle



(2) Idling

Stop lever angle





■ Full Load Adjustment (Torque Cam No. B88)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	Approx.1750	$R_1+0.3$	• Adjust using screw ③. (Do not enter governor control range)
Full Load Position Adjustment	1000	$R_1(10.6)$	• Adjust using screw ④.
Torque Cam Position Adjustment	500	$R_1+0.4$	• Adjust using screw ⑤.
	(300)	$R_1+0.95$	• Confirm
	(650)	$R_1(10.6)$	• Confirm
	(1050)	$R_1(10.6)$	• Confirm
	(1350)	$R_1+0.15$	• Confirm
	(1450)	$R_1+0.15$	• Confirm
	(1700)	$R_1+0.3$	• Confirm
	—	—	• Confirm
Confirm injection quantity at point A.			
Maximum Speed control Adjustment	Above1750	$R_1+0.3$	• Adjust using screw ③.
	$1900\pm 10$	7.5	• Confirm • After adjustment, confirm that the control lever angle is $39^\circ\sim 45^\circ$ .
Confirming Excess Fuel Limit for Engine Starting	400	Approx.9.5	• Set the control lever at point J.
	0	11.5	• Confirm
	0	Above $R_1+0.95$	• Move the control lever to the "full-speed" position and then confirm the control rack position.
Confirm the Black Smoke Limit	Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond $R_1+0.95$ mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 300 rpm.		
Rack Limiter Adjustment	• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is $67\sim 72$ cc/1000st.		
	Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I.		

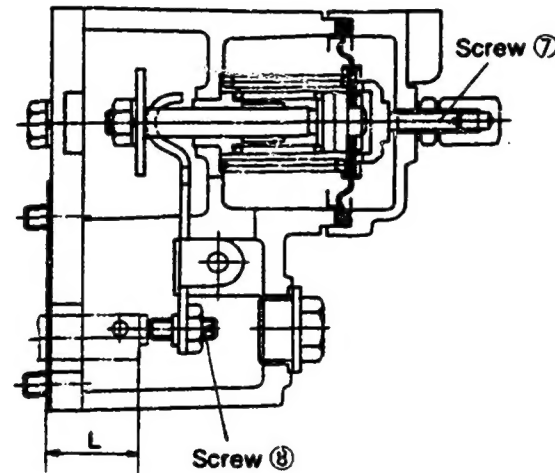
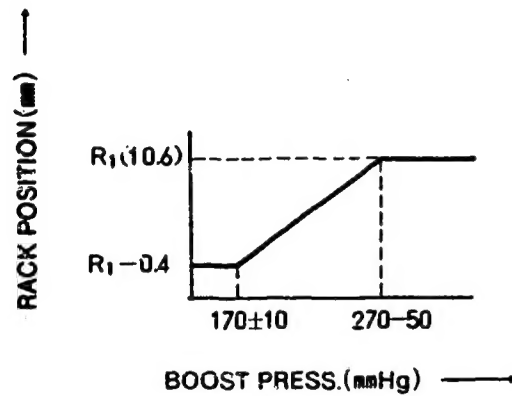
■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	215~225	11.0	• Adjust using spring capsule ①.
	325	9.5	• Adjust shim ① inside the spring capsule.
Governor Spring Contact Adjustment	585~615	7.5	• Adjust the governor shaft position.
	1230~1370	4.3	• Confirm
Setting the Idling Lever Position	325	Approx.9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle ( $21^\circ\sim 31^\circ$ )

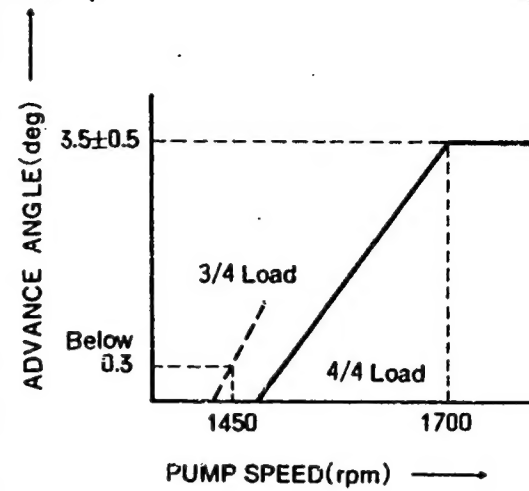
**Boost Compensator Adjustment**

- Maintain the pump speed at 700 rpm and fix the control lever in the full load position.
- In this condition, use calipers to measure the dimension "L" of the pushrod from the end face of the spacer. (Inspection: 23.5 to 24.5 mm)

Item	Boost press. (mmHg)	Rack Position (mm)	Remarks
Setting the Boost Compensator Spring Force	160~180	$R_1 - 0.4$	• Adjust using screw ⑦.
Boost Compensator Spring Adjustment (Boost compensator stroke: $0.4 \pm 0.1$ mm)	0	$R_1 - 0.4$	• Adjust using screw ⑧.
	160~180 220~320	$R_1 - 0.4$ $R_1(10.6)$	• Confirm • Confirm



**5. Timing Advance Specification :**

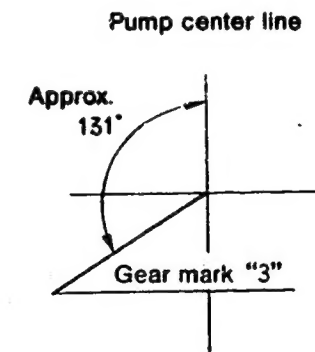


**<Note>**

1. Run the pump at 1450 rpm and fix the control lever when the fuel injection quantity obtained is approx. 44 cc/1000st.
2. Confirm that the timing advance angle is less than 0.3°.

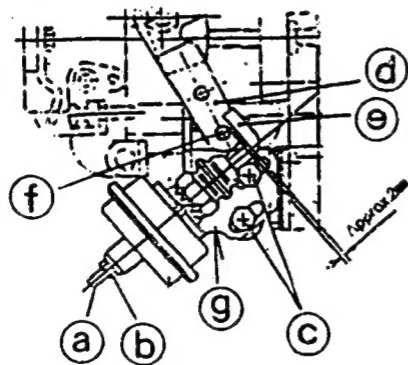
**Timing Setting**

At No. 1 plunger's beginning of injection position.  
B.D.T.C. : 11°



**FICD Actuator Adjustment**

1. Set the speed control lever (d) in the idling position.
2. Adjust the position of the FICD bracket (g) so that the clearance between the speed control lever pin (f) and the FICD actuator shaft (e) is approx. 2 mm.
3. Loosen the nut (b) and then screw in the screw (a) so that FICD stroke is zero.
4. Run the pump at 500 rpm and supply negative pressure of 500 mmHg to the FICD actuator chamber. Then, measure the rack position.
5. Run the pump at 500 rpm and supply negative pressure of 500 mmHg to the FICD actuator chamber. Then, adjust using screw (a) so that the rack position is 9.1 mm.
6. Confirm that the control lever (d) is in the idling position when negative pressure of zero is supplied, and that the control rack position is 9.1 mm when negative pressure of 500 mmHg is supplied.

**MICROSWITCH ADJUSTMENT**

1. Fix the control lever when the pump speed reaches 945~955 rpm and the control rack position is 8 mm.
2. Then, adjust the microswitch using the screw attached to the control lever so that the microswitch is ON.

**INJ. PUMP CALIBRATION DATA**

ENGINE MODEL 4D31T

BOSCH No. 9 400 610 058 1/6  
 DKKC No. 101401-1220  
 Date: 30. May. 1967 [5]  
 Company: MITSUBISHI  
 No. ME016740

Injection pump: PES4A 101040-9400 Governor: EP/RLD-E 105921-1711 Timing device: EP/SCDM 105676-0250

**1. Test Conditions :**

Pump rotation : clockwiseviewed from drive side  
 Nozzle & Nozzle Holder Ass'y : 105780-8140 (BOSCH Type No. EF8511/9A) Nozzle Holder : 105780-2080 (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>  
 Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm  
 Test Oil : ISO4113 or SAE Standard Test Oil(SAE J967d) Oil Temp. : 40<sup>±5</sup> °C  
 Overflow valve opening pressure : 2.6 Kg/cm<sup>2</sup> (Part No. 131424-6220 )

**2. Injection Timing :**

Pre-stroke : No. 1 Plunger 3.6 ± 0.05mm  
 Note : Adjust with control rod position of mm  
 Injection order : 1 <sup>90°±30'</sup> 3, 1 <sup>180°±30'</sup> 4, 1 <sup>270°±30'</sup> 2 (interval : \*±30')  
 Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type ; More than 0.3mm for all cylinders.  
 ; Shim adjustment type ; Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

**4. Injection Quantity :**

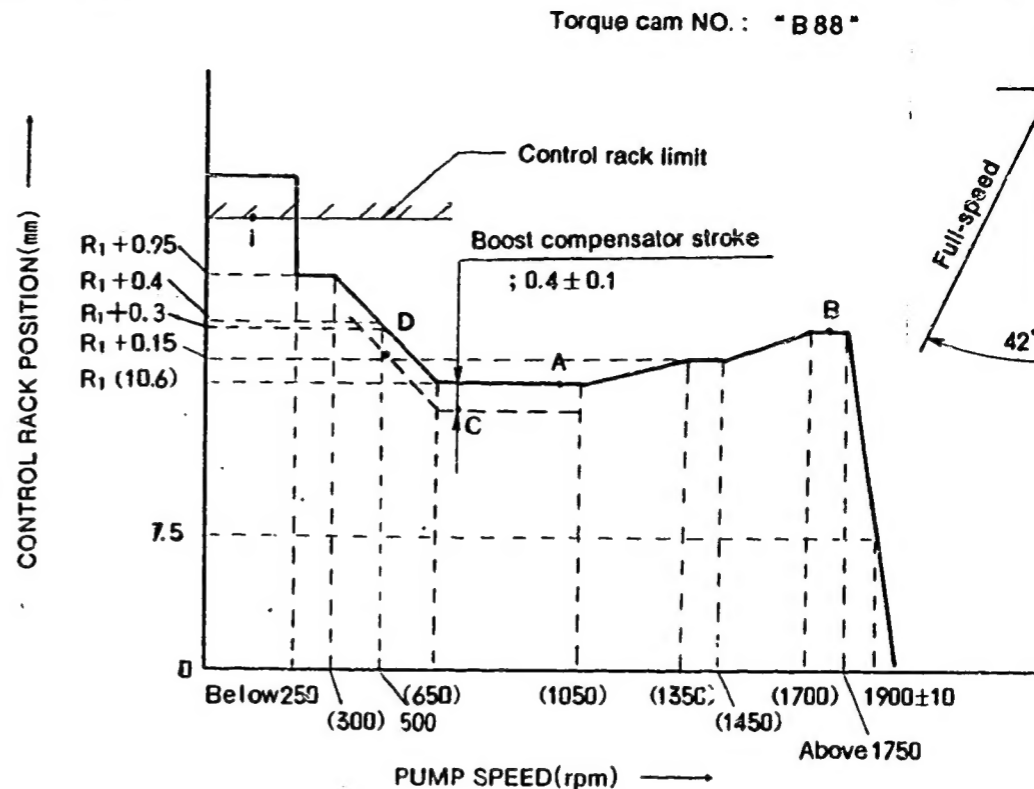
Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	10.6	1,000	54.1 ~ 56.1	±2.5	Rack	Basic
H	Approx. 9.5	325	8.7 ~ 11.3	±10	Rack	
A	R(10.6)	1,000	54.1 ~ 56.1	-	Lever	Basic Boost press. Above320mmHg
B	R+0.3	1,750	(69.0 ~ 73.0)	-	Lever	Boost press. Above320mmHg
C	R-(R-0.4)	700	(37.9 ~ 41.9)	-	Lever	
D	R+0.4	500	(33.7 ~ 37.7)	-	Lever	
I	-	100	67.0 ~ 72.0	-	Lever	Control rack limit

**5. Timing Advance Specification :**

Pump Speed (r.p.m)	Advance Angle (deg.)

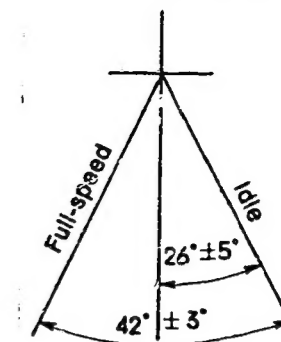
**3. GOVERNOR ADJUSTMENT**

(1) Full speed

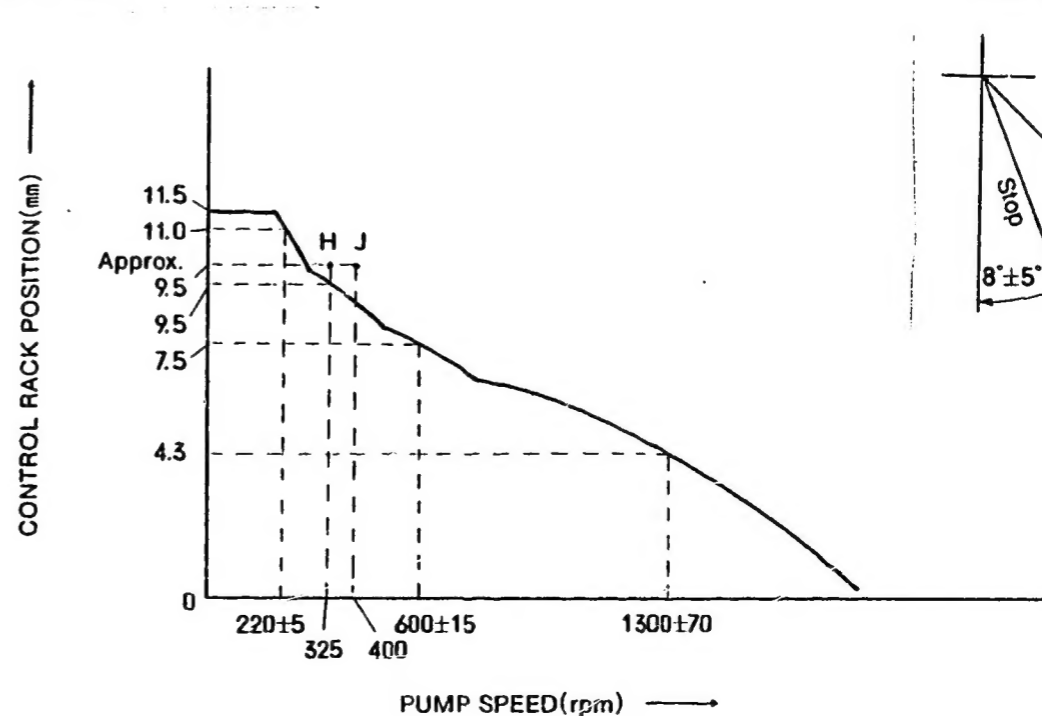


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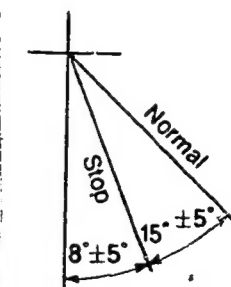
Control lever angle



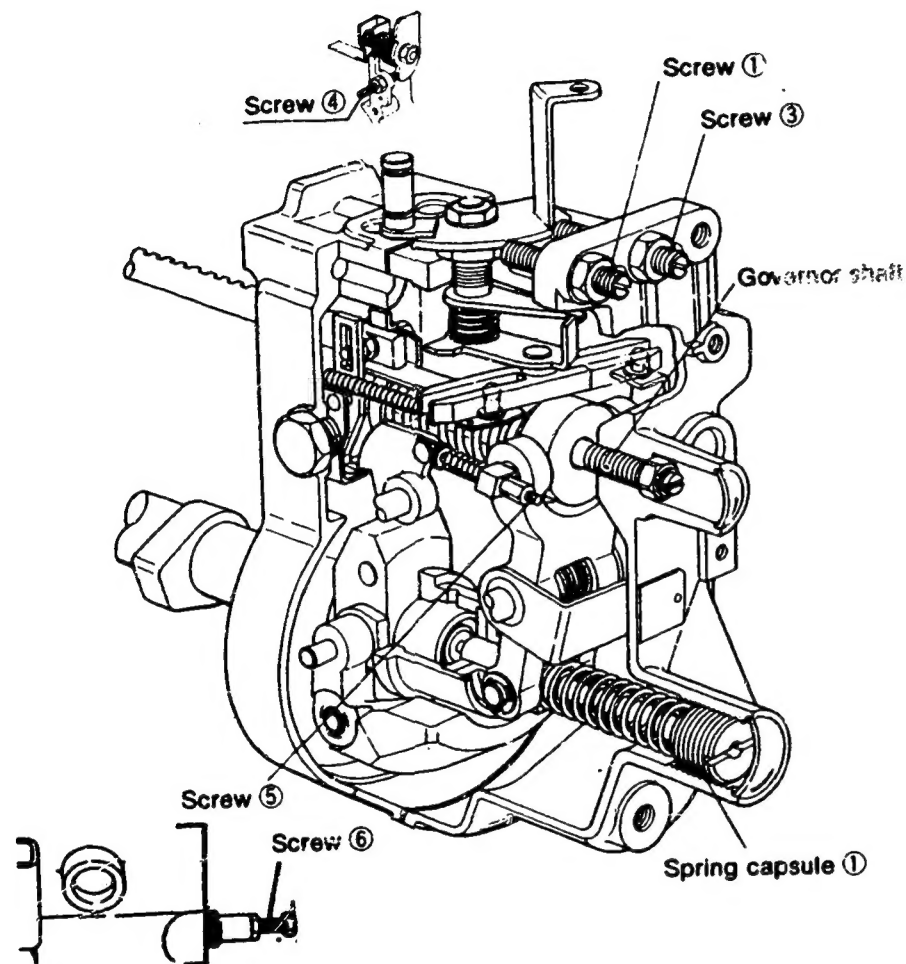
(2) Idling



Stop lever angle







■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	215~225	11.0	• Adjust using spring capsule ①. • Adjust shim ① inside the spring capsule.
	325	9.5	
Governor Spring Contact Adjustment	585~615	7.5	• Adjust the governor shaft position.
	1230~1370	4.3	• Confirm
Setting the Idling Lever Position	325	Approx.9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle (21°~31°)

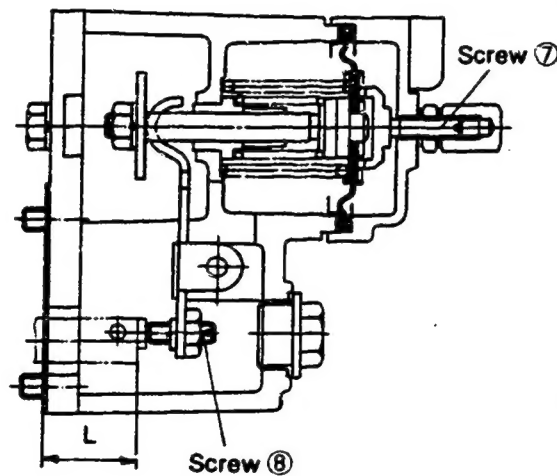
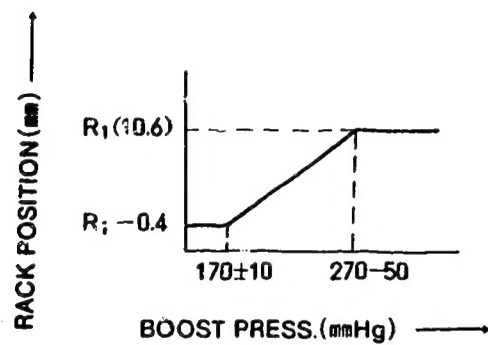
■ Full Load Adjustment (Torque Cam No. B88)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	Approx.1750	$R_1+0.3$	• Adjust using screw ③. (Do not enter governor control range)
Full Load Position Adjustment	1000	$R_1(10.6)$	• Adjust using screw ④.
Torque Cam Position Adjustment	500	$R_1+0.4$	• Adjust using screw ⑤.
	(300)	$R_1+0.95$	• Confirm
	(650)	$R_1(10.6)$	• Confirm
	(1050)	$R_1(10.6)$	• Confirm
	(1350)	$R_1+0.15$	• Confirm
	(1450)	$R_1+0.15$	• Confirm
	(1700)	$R_1+0.3$	• Confirm
	—	—	• Confirm
Confirm injection quantity at point A.			
Maximum Speed control Adjustment	Above1750	$R_1+0.3$	• Adjust using screw ③.
	1900±10	7.5	• Confirm • After adjustment, confirm that the control lever angle is 33°~45°.
Confirming Excess Fuel Limit for Engine Starting	400	Approx.9.5	• Set the control lever at point J.
	0	11.5	• Confirm
	0	Above $R_1+0.95$	• Move the control lever to the "full-speed" position and then confirm the control rack position.
Confirm the Black Smoke Limit	Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond $R_1+0.95$ mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 300 rpm.		
Rack Limiter Adjustment	• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is 62~72 cc/1000st.		
	Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I.		

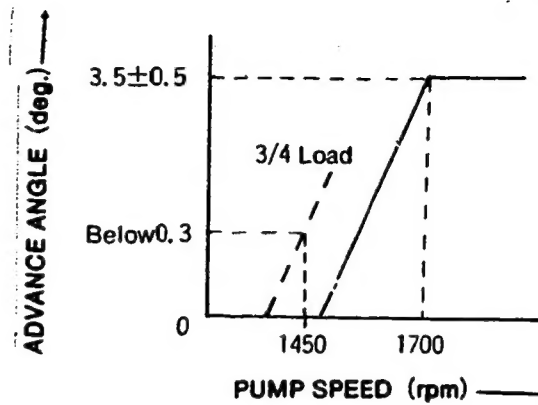
### ■ Boost Compensator Adjustment

- Maintain the pump speed at 700 rpm and fix the control lever in the full load position.
- In this condition, use calipers to measure the dimension "L" of the pushrod from the end face of the spacer. (Inspection: 23.5 to 24.5 mm)

Item	Boost press. (mmHg)	Rack Position (mm)	Remarks
Setting the Boost Compensator Spring Force	160~180	$R_1 - 0.4$	• Adjust using screw ⑦.
Boost Compensator Spring Adjustment (Boost compensator stroke: $0.4 \pm 0.1$ mm)	0	$R_1 - 0.4$	• Adjust using screw ⑧.
	160~180	$R_1 - 0.4$	• Confirm
	220~320	$R_1(10.6)$	• Confirm



### 5. Timing Advance Specification :

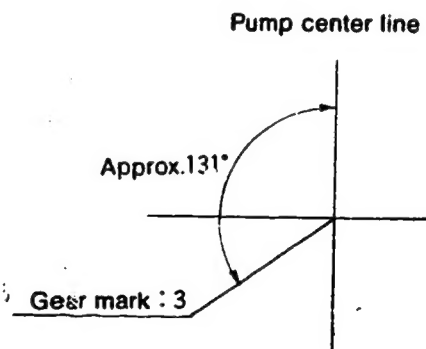


#### <Note>

1. Run the pump at 1450 rpm and fix the control lever when the fuel injection quantity obtained is approx. 44 cc/1000st.
2. Confirm that the timing advance angle is less than 0.3°.

#### ■ Timing Setting

At No. 1 plunger's beginning of injection position.  
B.D.T.C. : 11°



## INJ. PUMP CALIBRATION DATA

ENGINE MODEL 4D31T

BOSCH No. 9 400 610 059 1/7  
 DKKC No. 101401-1230  
 Date: 30.May.1987  
 Company: MITSUBISHI  
 No. ME016741

Injection pump : PES4A 101040-9400 Governor : EP/RLD-E 105921-1741 Timing device : EP/SCDM 105676-0250

### 1. Test Conditions :

Pump rotation : clockwise viewed from drive side

Nozzle & Nozzle Holder Ass'y : 105780-8140 (BOSCH Type No. EF8511/9A) Nozzle Holder : 105780-2080 (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>

Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm

Test Oil : ISO4113 or SAE Standard Test Oil(SAE J967d) Oil Temp. : 40<sup>±5</sup> °C

Overflow valve opening pressure : 2.6 Kg/cm<sup>2</sup> (Part No. 131424-6220)

### 2. Injection Timing :

Pre-stroke : No. 1 Plunger 3.6 ±0.05mm  
 Note : Adjust with control rod position of — mm

Injection order : 1 90<sup>±30</sup> 3, 1 180<sup>±30</sup> 4, 1 270<sup>±30</sup> 2 (interval : ±30°)

Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.  
 Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

### 4. Injection Quantity :

Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	10.6	1,000	54.1 ~ 56.1	±2.5	Rack	Basic
H	Approx. 9.5	325	8.7 ~ 11.3	±10	Rack	
A	R(10.6)	1,000	54.1 ~ 56.1	—	Lever	Basic Boost press. Above 320mmHg
B	R+0.3	1,750	(69.0 ~ 73.0)	—	Lever	Boost press. Above 320mmHg
C	R:(R-0.4)	700	(37.9 ~ 41.9)	—	Lever	Boost press.0
D	R+0.4	500	(33.7 ~ 37.7)	—	Lever	Boost press.0
I	—	100	67.0 ~ 72.0	—	Lever	Control rack limit

### 5. Timing Advance Specification :

Pump Speed (r.p.m)	Advance Angle (deg.)

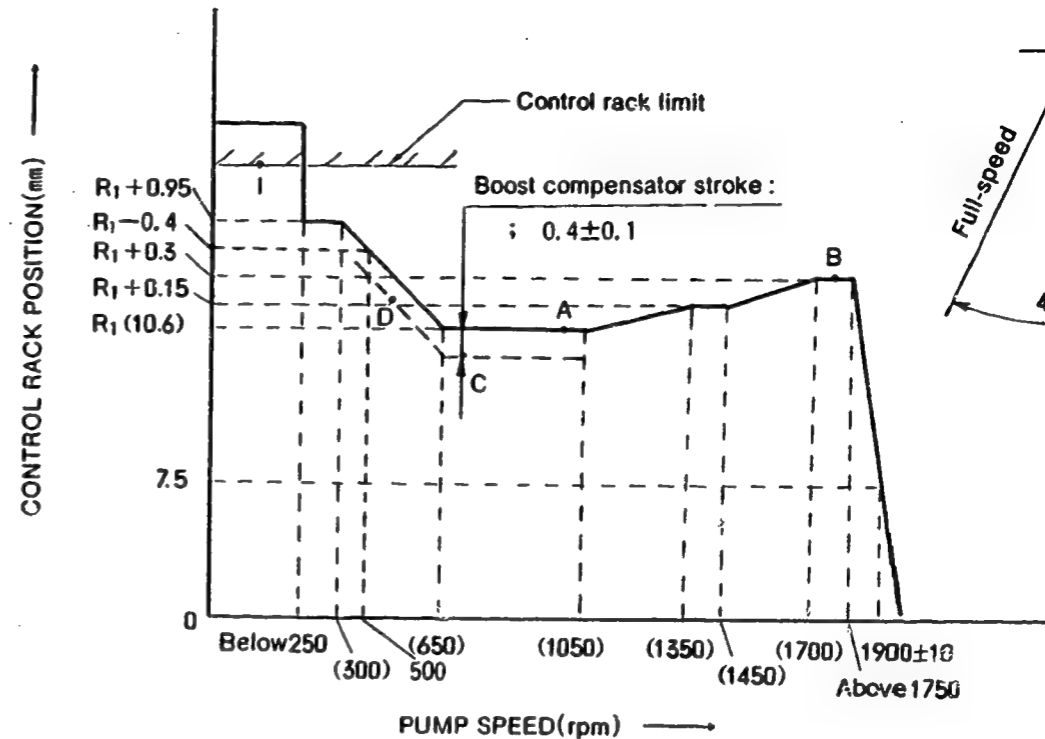
### 3. GOVERNOR ADJUSTMENT

(1) Full speed

Torque cam NO. : " B 88 "

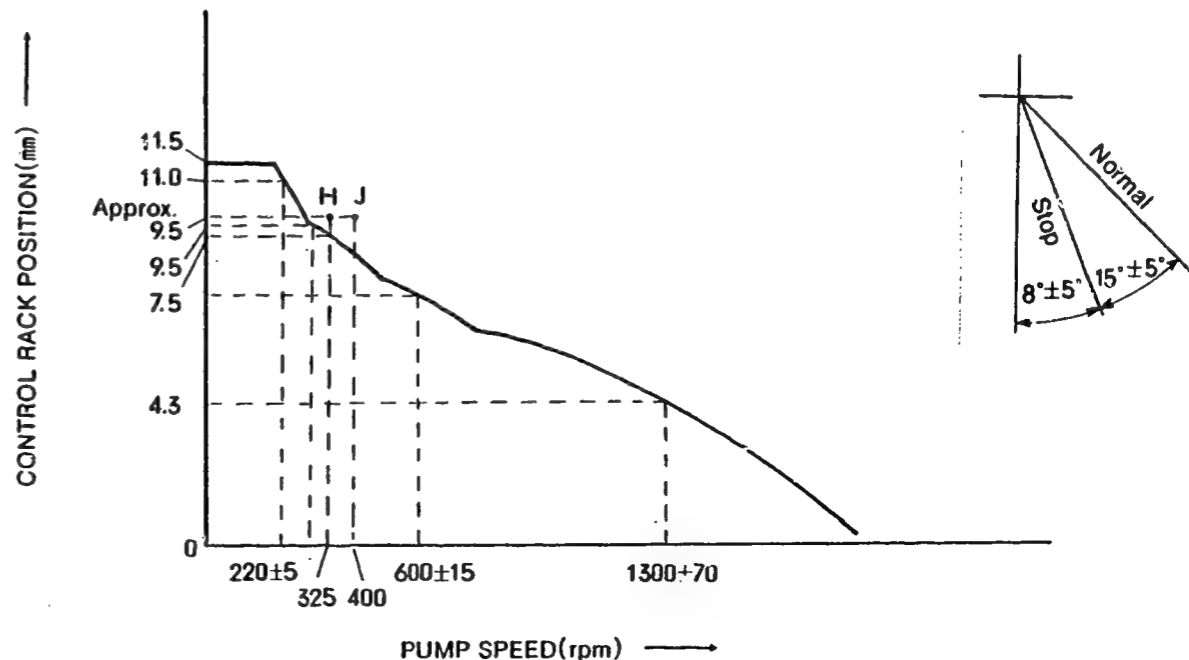
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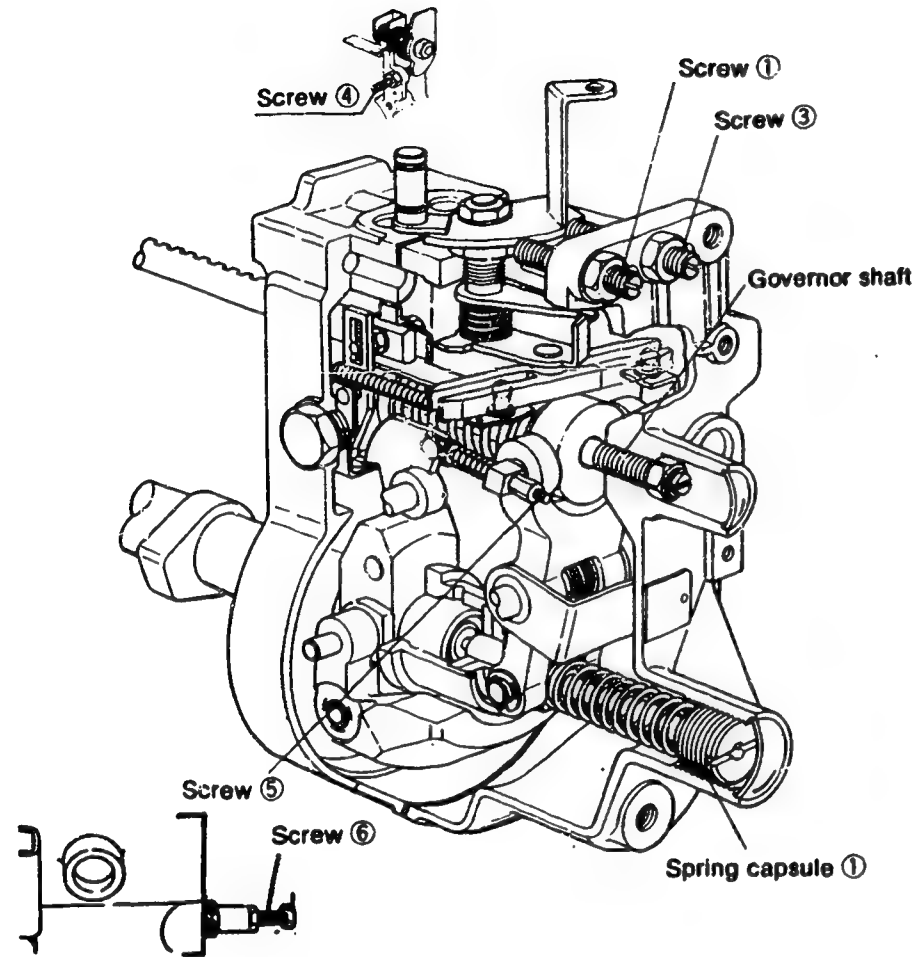
Control lever angle



(2) Idling

Stop lever angle





■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	215~225	11.0	• Adjust using spring capsule ①.
	325	9.5	• Adjust shim ① inside the spring capsule.
Governor Spring Contact Adjustment	585~615	7.5	• Adjust the governor shaft position.
	1230~1370	4.3	• Confirm
Setting the Idling Lever Position	325	Approx.9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle (21°~31°)

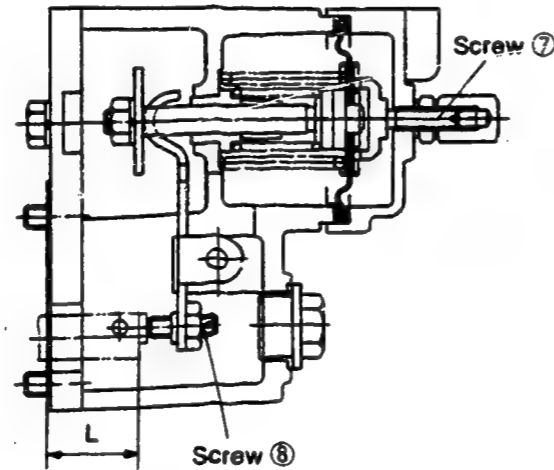
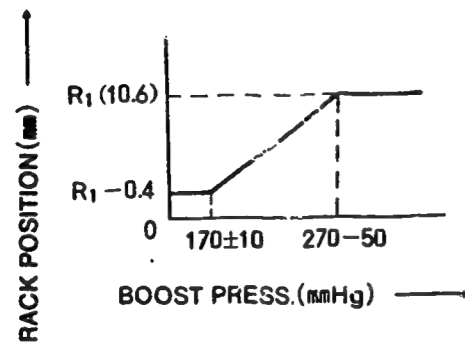
■ Full Load Adjustment (Torque Cam No. B88)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	Approx.1750	$R_1+0.3$	• Adjust using screw ③. (Do not enter governor control range)
Full Load Position Adjustment	1000	$R_1(10.6)$	• Adjust using screw ④.
Torque Cam Position Adjustment	500	$R_1+0.4$	• Adjust using screw ⑤.
	(300)	$R_1+0.95$	• Confirm
	(650)	$R_1(10.6)$	• Confirm
	(1050)	$R_1(10.6)$	• Confirm
	(1350)	$R_1+0.15$	• Confirm
	(1450)	$R_1+0.15$	• Confirm
	(1700)	$R_1+0.3$	• Confirm
	—	—	• Confirm
	—	—	• Confirm
	Confirm injection quantity at point A.		
Maximum Speed control Adjustment	Above1750	$R_1+0.3$	• Adjust using screw ③.
	$1900\pm 10$	7.5	• Confirm • After adjustment, confirm that the control lever angle is 39°~45°.
Confirming Excess Fuel Limit for Engine Starting	400	Approx.9.5	• Set the control lever at point J .
	0	11.5	• Confirm
	0	Above $R_1+0.95$	• Move the control lever to the "full-speed" position and then confirm the control rack position.
Confirm the Black Smoke Limit	Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond $R_1+0.95$ mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 300 rpm.		
Rack Limiter Adjustment	• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is 67~72 cc/1000st.		
	Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I .		

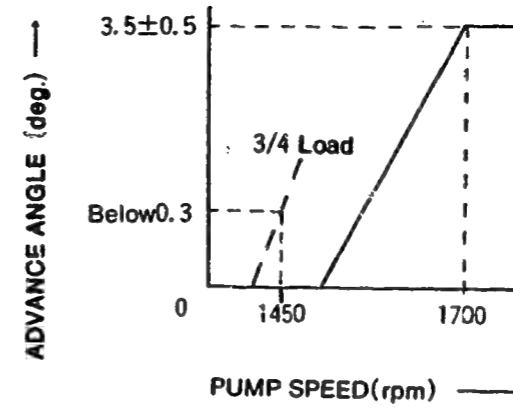
### ■ Boost Compensator Adjustment

- Maintain the pump speed at 700 rpm and fix the control lever in the full load position.
- In this condition, use calipers to measure the dimension "L" of the pushrod from the end face of the spacer. (Inspection: 23.5 to 24.5 mm)

Item	Boost press. (mmHg)	Rack Position (mm)	Remarks
Setting the Boost Compensator Spring Force	160~180	$R_1 - 0.4$	• Adjust using screw ⑦.
Boost Compensator Spring Adjustment (Boost compensator stroke: $0.4 \pm 0.1$ mm)	0	$R_1 - 0.4$	• Adjust using screw ⑧.
	160~180	$R_1 - 0.4$	• Confirm
	220~320	$R_1 (10.6)$	• Confirm



### 5. Timing Advance Specification

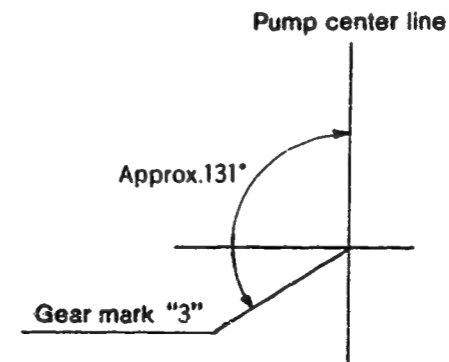


#### <Note>

1. Run the pump at 1450 rpm and fix the control lever when the fuel injection quantity obtained is approx. 44 cc/1000st.
2. Confirm that the timing advance angle is less than 0.3°.

### ■ Timing Setting

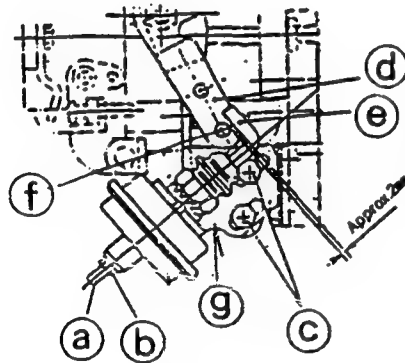
At No. 1 plunger's beginning of injection position.  
B.D.T.C. : 11°



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**FICD Actuator Adjustment**

1. Set the speed control lever (d) in the idling position.
2. Adjust the position of the FICD bracket (g) so that the clearance between the speed control lever pin (f) and the FICD actuator shaft (e) is approx. 2 mm.
3. Loosen the nut (b) and then screw in the screw (a) so that FICD stroke is zero.
4. Run the pump at 500 rpm and supply negative pressure of 500 mmHg to the FICD actuator chamber. Then, measure the rack position.
5. Run the pump at 500 rpm and supply negative pressure of 500 mmHg to the FICD actuator chamber. Then, adjust using screw (a) so that the rack position is 9.1 mm.
6. Confirm that the control lever (d) is in the idling position when negative pressure of zero is supplied, and that the control rack position is 9.1 mm when negative pressure of 500 mmHg is supplied.

**MICROSWITCH ADJUSTMENT**

1. Fix the control lever when the pump speed reaches 945~955 rpm and the control rack position is 8 mm.
2. Then, adjust the microswitch using the screw attached to the control lever so that the microswitch is ON.

## INJ. PUMP CALIBRATION DATA

ENGINE MODEL FE6B

BOSCH No. 9 400 610 055 1/5  
 DKKC No. 101601-9931  
 Date: 30.May.1987  
 Company: NISSAN DIESEL  
 No. 16713 Z5661

Injection pump : PE6A 101060-3330 Governor : EP/RLD-A 105921-1022 Timing device : EP/SA 105614-3290

### 1. Test Conditions :

Pump rotation : clockwise viewed from drive side

Nozzle & Nozzle Holder Ass'y : 105780-8140 (BOSCH Type No. EF8511/9A) Nozzle Holder : 105780-2080 (BOSCH Type No. EF8511/9)

Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>

Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm

Test Oil : ISO4113 or SAE Standard Test Oil (SAE J967d) Oil Temp. : 40<sup>+5</sup> °C

Overflow valve opening pressure : 1.6 Kg/cm<sup>2</sup> (Part No. — )

### 2. Injection Timing :

Pre-stroke : No. 1 Plunger 3.4 ±0.05mm  
 Note : Adjust with control rod position of mm

Injection order : 1  $\frac{60^\circ \pm 30'}{4}$ , 1  $\frac{120^\circ \pm 30'}{2}$ , 1  $\frac{180^\circ \pm 30'}{6}$ , 1  $\frac{240^\circ \pm 30'}{3}$ , 1  $\frac{300^\circ \pm 30'}{5}$  (interval : °±30')

Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.  
 Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

### 4. Injection Quantity :

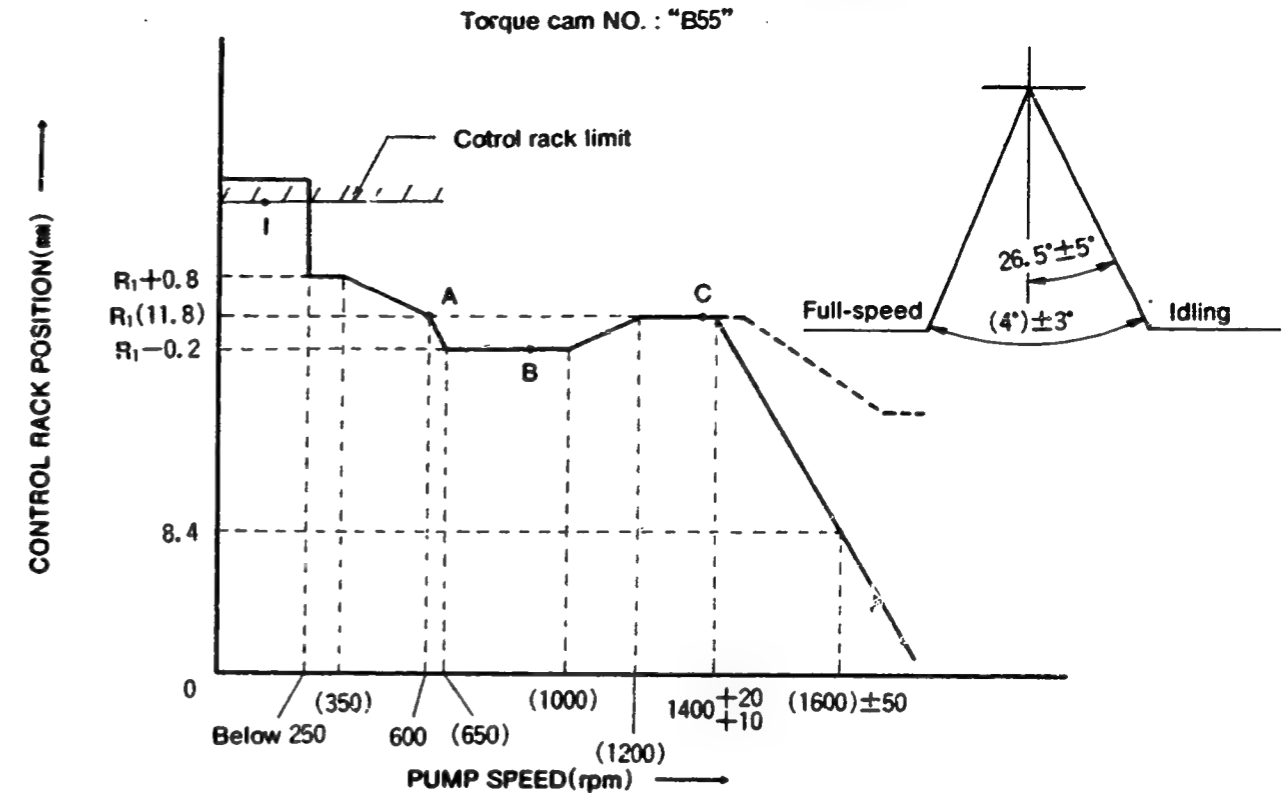
Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	11.8	600	64.7 ~ 67.9	±3.5	Rack	Basic
H	Approx. 9.5	300	7.7 ~ 11.3	±10	Rack	
A	R(11.8)	600	65.3 ~ 67.3	—	Lever	
B	R-0.2	900	(71.4 ~ 74.6)	—	Lever	
C	R(11.8)	1,400	(79.0 ~ 83.0)	—	Lever	
I	—	100	84.0 ~ 94.0	—	Lever	Control rack limit

### 5. Timing Advance Specification :

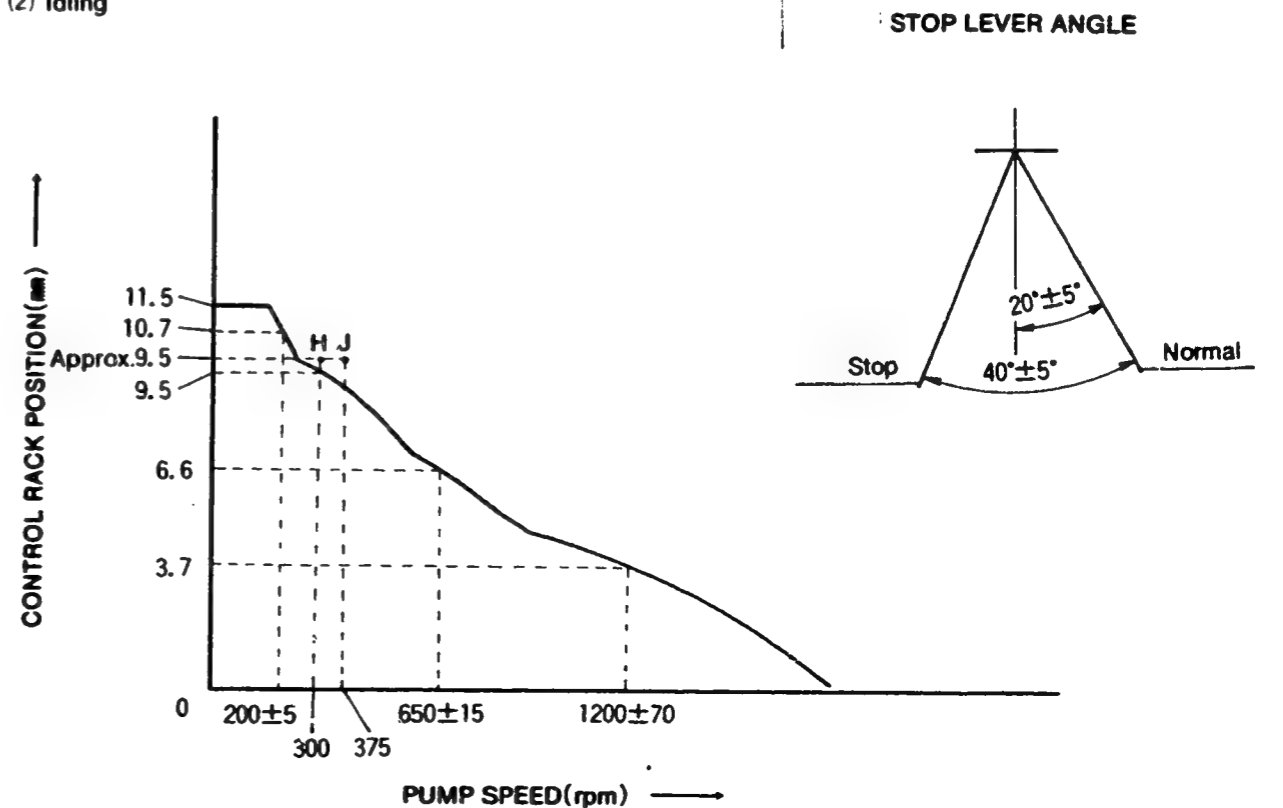
Pump Speed (r.p.m)	Below 850	800	1,400
Advance Angle (deg.)	Start	Below 0.5	Finish 1.5~2.5

### 3. GOVERNOR ADJUSTMENT

(1) Full speed

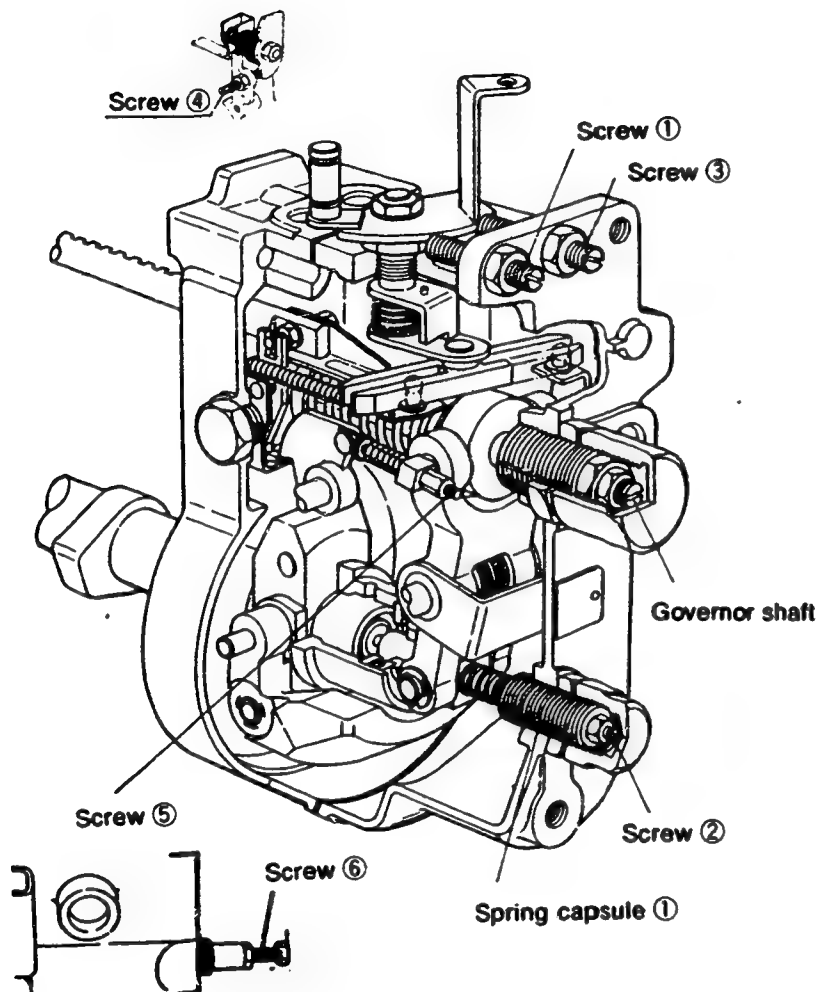


(2) Idling



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■ Full Load Adjustment (Torque Cam No. B55)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	1400	$R_1(11.8)$	• Adjust using screw ⑤. (Do not enter governor control range)
Full Load Position Adjustment	900	$R_1-0.2$	• Adjust using screw ④.
Torque Cam Position Adjustment	600	$R_1(11.8)$	• Adjust using screw ⑤.
	(350)	$R_1+0.8$	• Confirm
	(650)	$R_1-0.2$	• Confirm
	(1000)	$R_1-0.2$	• Confirm
	(1200)	$R_1(11.8)$	• Confirm
	—	—	• Confirm
	—	—	• Confirm
	—	—	• Confirm
Confirm injection quantity at points A to B.			
Maximum Speed control Adjustment	1390~1420	$R_1(11.8)$	• Adjust using screw ③.
	(1550~1650)	8.4	• Confirm
	—	—	• After adjustment, confirm that the control lever angle is ( $1^\circ \sim 7^\circ$ ).
Confirming Excess Fuel Limit for Engine Starting	375	Approx 9.5	• Set the control lever at point J.
	0	11.5	• Confirm
	0	Above $R_1+0.8$	• Move the control lever to the "full-speed" position and then confirm the control rack position.
Confirm the Black Smoke Limit	Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond $R_1+0.8$ mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 350 rpm.		
Rack Limiter Adjustment	• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is 84~94 cc/1000st.		
	Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I.		

■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	195~205	10.7	• Adjust using spring capsule ①.
	300	9.5	• Adjust using screw ②.
Governor Spring Contact Adjustment	635~665	6.6	• Adjust the governor shaft position.
	1130~1270	3.7	• Confirm
Setting the Idling Lever Position	300	Approx 9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle ( $21.5^\circ \sim 31.5^\circ$ )

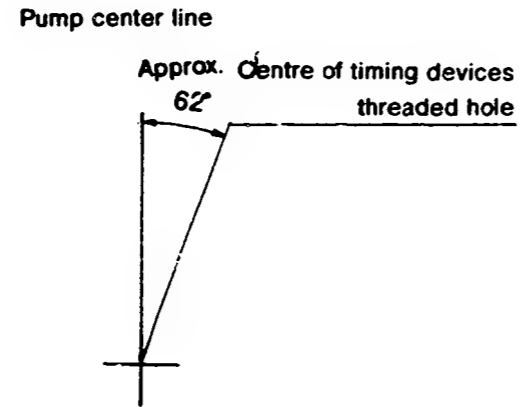


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■ Timing Setting

At No. 1 plunger's beginning of injection position.

B.D.T.C. :—



# INJ. PUMP CALIBRATION DATA

ENGINE MODEL SD33

BOSCH No. 9 400 610 060 1/4  
 DKKC No. 101631-9774  
 Date : 30.May.1987 [4]  
 Company : NISSAN DIESEL  
 No. 16700 C8605

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Injection pump : PES6A 101063-9371 Governor : EP/RBD 105542-4271 Timing device : EP/SCD 105622-1100

## 1. Test Conditions :

Pump rotation : clockwise viewed from drive side

Nozzle & Nozzle Holder Ass'y : 105780-8140 (BOSCH Type No. EF8511/9A) Nozzle Holder : 105780-2080 (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>

Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm -- Length 600 mm

Test Oil : ISO4113 or SAE Standard Test Oil (SAE J967c) Oil Temp. : 40<sup>+5</sup> °C

Overflow valve opening pressure : — Kg/cm<sup>2</sup> (Part No. — )

## 2. Injection Timing :

Pre-stroke : No. 1 Plunger 2.0 ±0.05mm  
 Note : Adjust with control rod position of — mm

Injection order : 1  $60^{\pm 30}$ , 4, 1  $120^{\pm 30}$ , 2, 1  $180^{\pm 30}$ , 6, 1  $240^{\pm 30}$ , 3, 1  $300^{\pm 30}$  5 (interval : °±30')

Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.  
 Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

## 4. Injection Quantity :

Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	12.2	800	31.1 ~ 33.1	±2.5	Rack	Basic
	Approx. 7.8	300	6.5 ~ 8.5	±15	Rack	
	12.2	800	31.1 ~ 33.1	±2.5	Rack	
	11.7	1,900	34.5 ~ 37.7	±4	Rack	
	15±0.1	100	—	—	Rack	Control rack limit

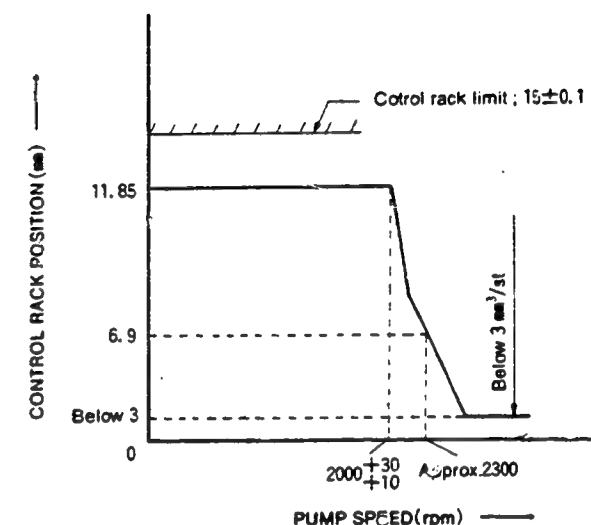
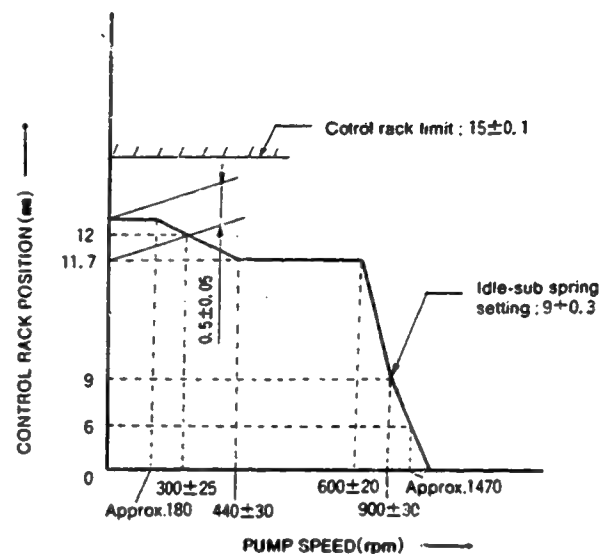
## 5. Timing Advance Specification :

Pump Speed (r.p.m)	Below 550	500	1,100	1,900
Advance Angle (deg.)	Start	Below 0.5	1.2~2.2	Finish 5.5~6.5

## 3. GOVERNOR ADJUSTMET

(i) Pneumatic Governor

(2) Mechanical Governor



### ■ Air Tightness Test

- Increase the pressure of the pneumatic governor's negative pressure chamber to 500 mmAq at a pump speed of 500 rpm and a control rack position of 12.2 mm.
- Then, confirm that it takes 10 seconds or more for the negative pressure to fall from 500 mmAq to 480 mmAq.

### ■ Adjustment

- Pneumatic Governor (Pump Speed : 500 rpm)

Item	Negative Press. (mmAq)	Rack Position (mm)	Remarks
Smoke Set Screw Adjustment	0	12.2	• Adjust using spring capsule ①.
Torque Control Adjustment	Approx 180	12.2	• Adjust thickness of shim ①.
		11.7	• Adjust thickness of shim ②.
	275~325	12.0	
		—	—

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Item	Negative Press. (mmAq)	Rack Position (mm)	Remarks
High-speed Control Adjustment	580~620	11.7	• Adjust thickness of shim ③.
Idling Adjustment	870~930 Approx 1470	9±0.3 6	• Adjust using spring capsule ②. • Confirm

2. Mechanical Governor (Negative pressure: 370±20 mmAq)

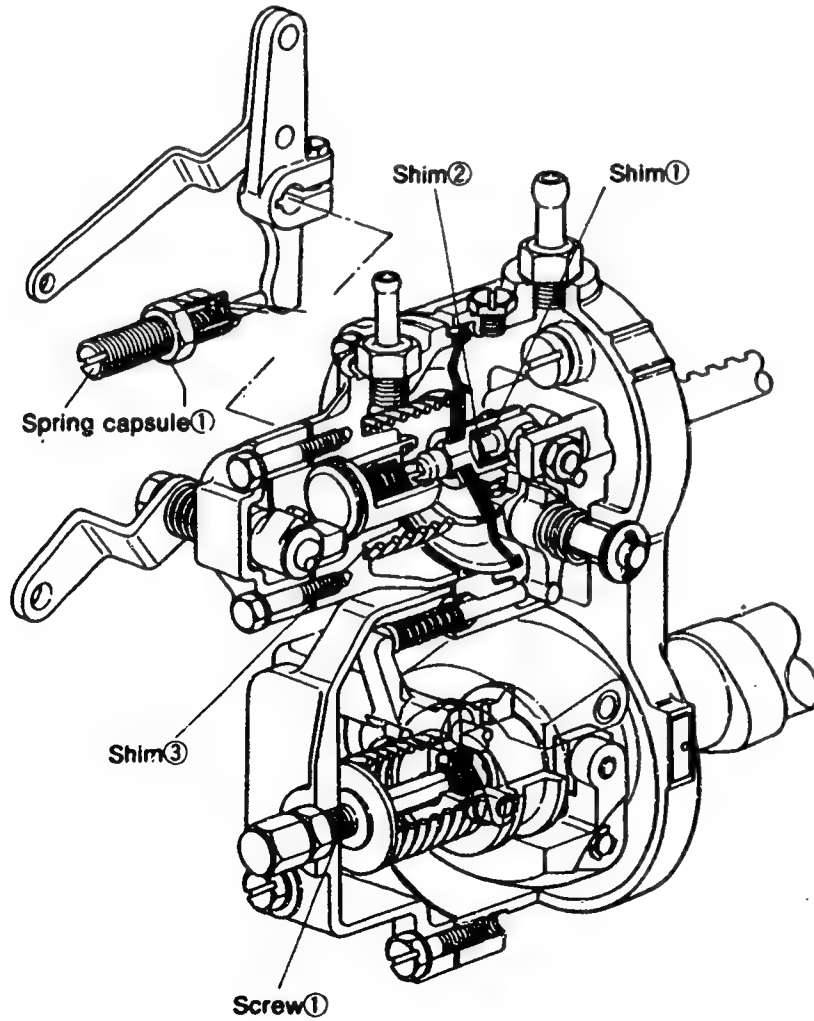
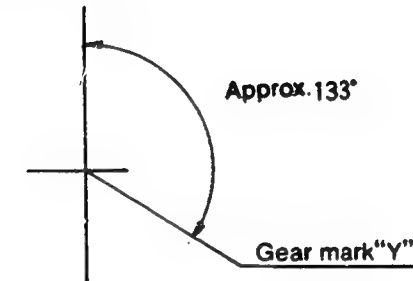
Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Maximum Speed Control Adjustment	2010~2030 Approx 2300	11.85 6.9	• Adjust using screw ①. • Confirm • Confirm (Check the fuel injection quantity: below 3 cc/1000st)

■ Timing Setting

At No.1 plunger's beginning of injection position.

B.T.D.C. : 20°

Pump center line



# INJ. PUMP CALIBRATION DATA

ENGINE MODEL SD33T

BOSCH No.9 400 610 061 1/6  
 DKKC No. 101641-9214  
 Date : 30.May.1987 4  
 Company : NISSAN DIESEL  
 No. 16700 C8705

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Injection pump : PES6A Governor : EP/RLO-E  
 101064-9081 105931-4281

Timing device : EP/SCD  
 105622-1120

## 1. Test Conditions :

Pump rotation : clockwise viewed from drive side

Nozzle & Nozzle Holder Ass'y : 105780-8140 Nozzle Holder : 105780-2080  
 (BOSCH Type No. EF8511/9A) (BOSCH Type No. EF8511/9)  
 Nozzle opening pressure : 175 Kg/cm<sup>2</sup> Transfer pump pressure : 1.6 Kg/cm<sup>2</sup>

Injection pipe : Inner Dia. 2 mm X Outer Dia. 6 mm - Length 600 mm

Test Oil : ISO4113 or SAE Standard Test Oil (SAE J967d) Oil Temp. : 40<sup>+5</sup> °C

Overflow valve opening pressure : — Kg/cm<sup>2</sup> (Part No. — )

## 2. Injection Timing :

Pre-stroke : No. 1 Plunger 2.3 ±0.05mm

Note : Adjust with control rod position of — mm

Injection order : 1 60°±30' 4, 1 120°±30' 2, 1 180°±30' 6, 1 240°±30' 3, 1 300°±30' 5 (interval : °±30')

Plungers are numbered from the Drive side.

Tappet clearance : Bolt adjustment type : More than 0.3mm for all cylinders.

: Shim adjustment type : Manually rotate the camshaft 2~3 times and confirm that it rotates smoothly.

## 4. Injection Quantity :

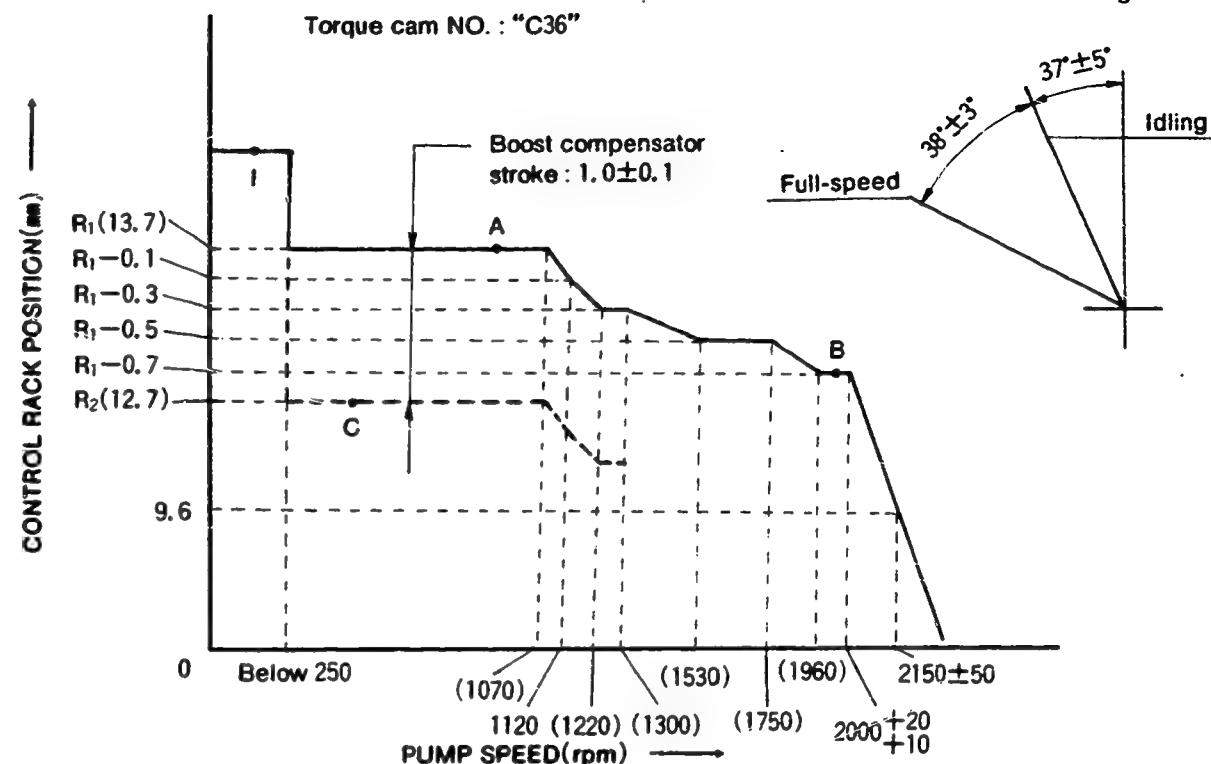
Adjusting Point	Rod Position (mm)	Pump Speed (r.p.m)	Injection Q'ty (cc/1000 strokes)	Max. var bet. cyl (%)	Fixed	Remarks
	13.7	1,000	47.2 ~ 49.4	±2	Rack	Basic
H	Approx. 9.5	360	6.4 ~ 8.6	±15	Rack	
A	R:(13.7)	1,000	47.2 ~ 49.4	—	Lever	Basic Boost press. Above 400mmHg
B	R-0.7	2,000	45.2 ~ 49.2	—	Lever	Boost press. Above 400mmHg
C	R:(12.7)	500	32.6 ~ 36.6	—	Lever	Boost press.0
I	—	100	42.0 ~ 52.0	—	Lever	Boost press.0

## 5. Timing Advance Specification :

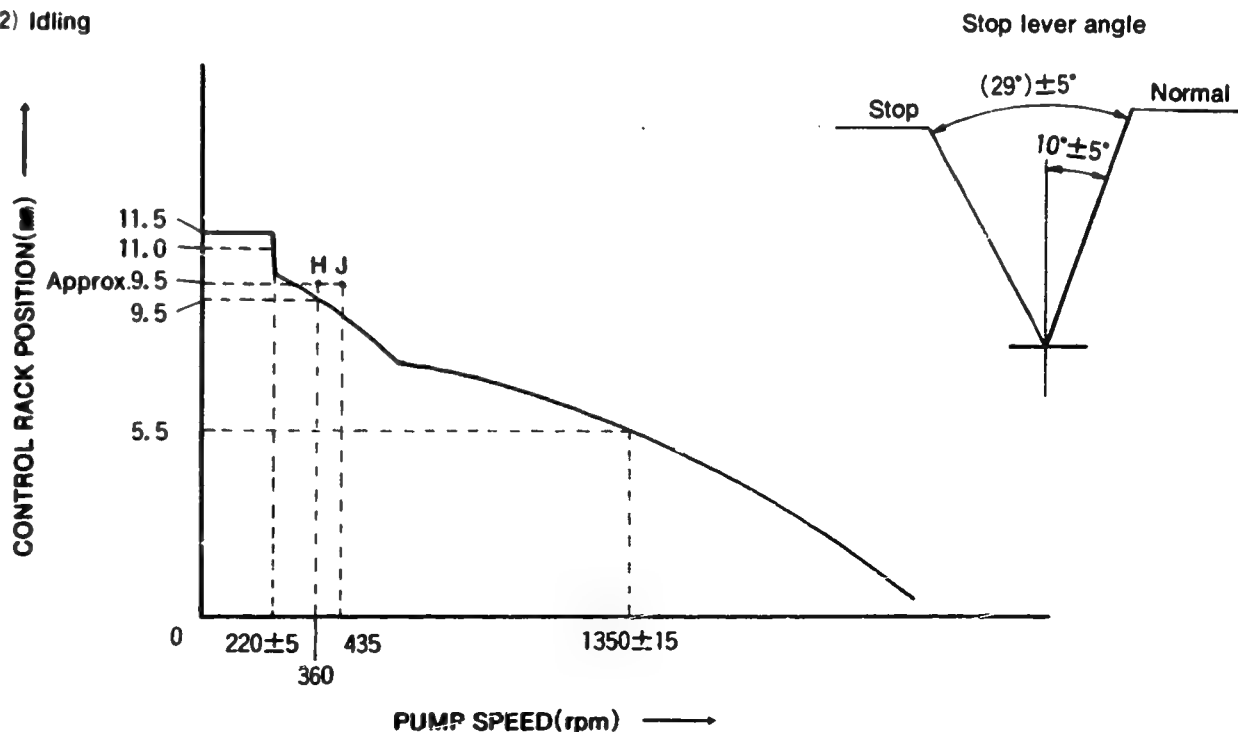
Pump Speed (r.p.m)	Below 550	500	1,200	1,900
Advance Angle (deg.)	Start	Below 0.5	1.7~2.7	Finish 5.5~6.5

## 3. GOVERNOR ADJUSTMENT

(1) Full speed

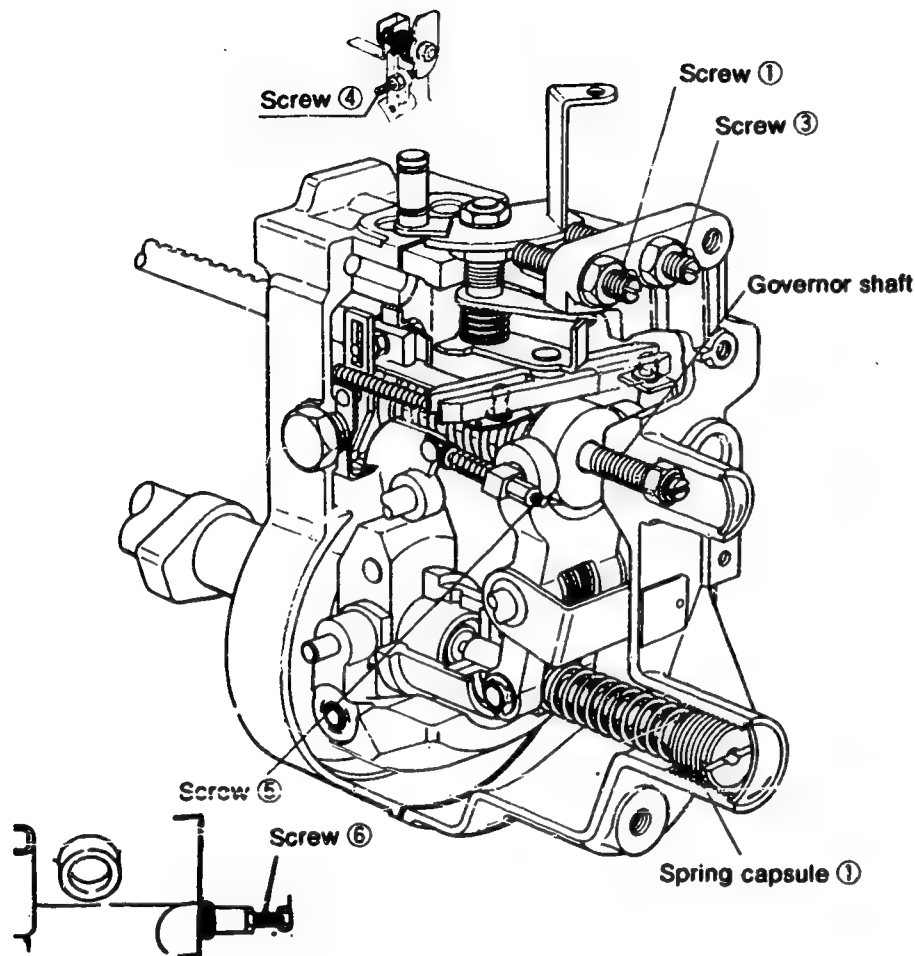


(2) Idling



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101641-9214 4/6



■ Full Load Adjustment (Torque Cam No. C36)

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Full Speed Lever Position: Temporary Setting	2000	R <sub>1</sub> -0.7	• Adjust using screw ③. (Do not enter governor control range)
Full Load Position Adjustment	1000	R <sub>1</sub> (13.7)	• Adjust using screw ④.
Torque Cam Position Adjustment	1120	R <sub>1</sub> -0.1	• Adjust using screw ⑤.
	(1070)	R <sub>1</sub> (13.7)	• Confirm
	(1220)	R <sub>1</sub> -0.3	• Confirm
	(1300)	R <sub>1</sub> -0.3	• Confirm
	(1530)	R <sub>1</sub> -0.5	• Confirm
	(1750)	R <sub>1</sub> -0.5	• Confirm
	(1960)	R <sub>1</sub> -0.7	• Confirm
	—	—	• Confirm

Confirm injection quantity at point A.

Maximum Speed control Adjustment	1990~2020	R <sub>1</sub> -0.7	• Adjust using screw ③.
	2100~2200	9.6	• Confirm
	—	—	• After adjustment, confirm that the control lever angle is 35°~41°.

Confirming Excess Fuel Limit for Engine Starting	435	Approx.9.5	• Set the control lever at point J.
	0	11.5	• Confirm
	0	Above R <sub>1</sub> (13.7)	• Move the control lever to the "full-speed" position and then confirm the control rack position.

**Confirm the Black Smoke Limit**  
Fix the control lever at point H. Then, operate the pump at 250 rpm. Confirm that the control rack does not move beyond R<sub>1</sub>(13.7) mm. When the control lever is moved to the "full-speed" position again increase the pump speed and confirm that the control rack starts to move from a pump speed of 1070 rpm.

**Rack Limiter Adjustment**  
• Fix the control lever in the full speed position, and fix the control rack using the screw (157954-3700) when the pump speed reaches 100 rpm and the fuel injection quantity obtained is 42~52 cc/1000st.

Measure the depth of the control rack cap. Then, adjust screw ⑥ so that it equals the depth of the rack cap and install the rack cap. Confirm injection quantity at point I.

■ Idling Adjustment

Item	Pump Speed (rpm)	Rack Position (mm)	Remarks
Idling Lever Position: Temporary Setting	80~100	11.5	• Adjust using screw ①.
Idling Position Setting	215~225	11.0	• Adjust using spring capsule ①.
	360	9.5	• Adjust shim ① inside the spring capsule.
Governor Spring Contact Adjustment	1335~1365	5.5	• Adjust the governor shaft position.
	—	—	• Confirm
Setting the Idling Lever Position	360	Approx.9.5	• Adjust using screw ①.
	—	—	• Confirm the control lever angle (32°~42°)

■ Boost Compensator Adjustment

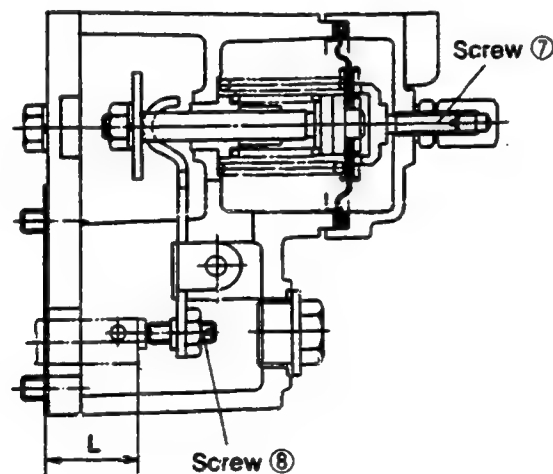
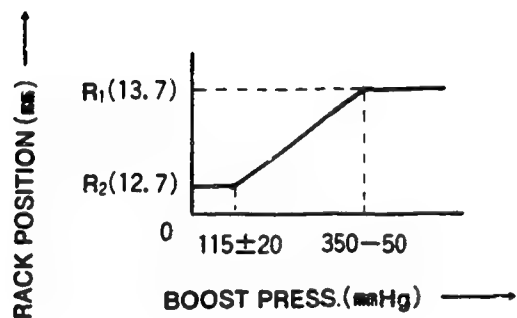
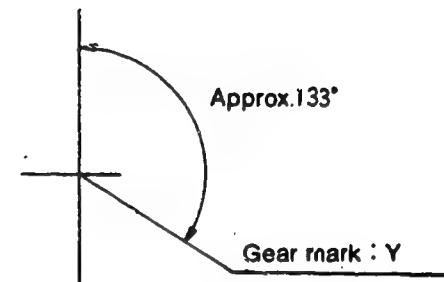
- Maintain the pump speed at 700 rpm and fix the control lever in the full load position.
- In this condition, use calipers to measure the dimension "L" of the pushrod from the end face of the spacer. (Inspection: 23.5 to 24.5 mm)

Item	Boost press. (mmHg)	Rack Position (mm)	Remarks
Setting the Boost Compensator Spring Force	95~135	R <sub>2</sub> (12.7)	• Adjust using screw ⑦.
Boost Compensator Spring Adjustment (Boost compensator stroke: 1.0±0.1 mm)	0	R <sub>2</sub> (12.7)	• Adjust using screw ⑧.
	95~135	R <sub>2</sub> (12.7)	• Confirm
	300~350	R <sub>1</sub> (13.7)	• Confirm

■ Timing Setting

- At No. 1 plunger's beginning of injection position.
- B.D.T.C. : 20°

Pump center line



# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
! S O 4113 or  
S A E J967d

ENGINE MODEL : 4D56

Injection pump No: 104640-3370 [NP-VE4/10F2100RNP460]

Pump rotation : clockwise-viewed from drive side

Pre-stroke : — mm

BOSCH No.9 460 610 234 1/3

DKKC No. 104740-3670

Date : 30.May.1987

Company : MITSUBISHI

No. MD106444

104740-3670 2/3

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~ 3.9 (mm)		
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,250	45.3~46.3 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	375	6.5~ 9.5 (cc/1,000st)		2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,550	15.1~21.1 (cc/1,000st)		4.0
1-7 Load-timer adjustment	1,250	T=0.4± 0.8 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	500	750	1,250	2,100
	mm	0.6~ 1.8	1.4~ 2.6	3.3~ 4.1	6.6~ 7.8
2-2 Supply pump	N = rpm	600	1,250	2,100	
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.5~ 7.1	
2-3 Overflow delivery	N = rpm	1,250			
	cc/10s	48.0~92.0			
2-4 Fuel injection quantities	Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position		1,250	44.8~46.8		
		600	42.3~46.3		
		2,100	37.2~41.2		
		2,550	13.1~23.1		
		2,900	Below 5.0		
Switch OFF		375	0		
Idling position		600	Below 3.0		
		375	6.0~10.0		
2-5 Solenoid	Max.cut-in voltage : 8 V				
	Test voltage : 12~14 V				

### 3. Dimensions

K	3.2~3.4 mm
KF	5.7~5.9 mm
MS	1.1~1.3 mm
BCS	— mm
Control lever angle	
α	55.0~63.0 deg
A	10.5~16.0 mm
β	41.0~51.0 deg
B	12.5~16.5 mm
γ	— deg
C	— mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : — mmHg

Pump Speed : 1,250 rpm

Fuel Injection : 35.7±0.5 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/3 )

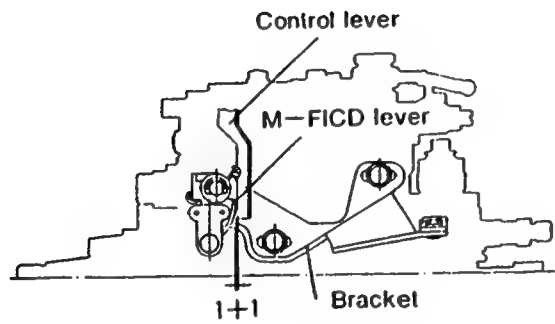
#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1,250	34.7~36.7	—	(3.1)	0.2~1.0
1,250	26.7~29.7	—	(2.3)	0.8~2.0

■ FICD Mounting Position Adjustment

1. Hold the control lever in the idling position.
2. Position the FICD mounting bracket so that the gap between the control lever and the FICD lever is  $1 \pm 1$  mm.





# INJ. PUMP CALIBRATION DATA

## Distributor-type

BOSCH No.9 460 610 235  
 DKKC No. 104740-3680  
 Date : 30.May.1987   
 Company : MITSUBISHI  
 No. MD106426

104740-3680

TEST OIL:  
 I S O 4113 or  
 S A E J967d

ENGINE MODEL : 4D56

Injection pump No: 104640-3380 [NP-VE4/10F2100RNP461]

Pump rotation : clockwise-viewed from drive side  
 Pre-stroke : - mm

For Test Condition see  
 Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~ 3.9 (mm)		
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,250	45.3~46.3 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	375	6.5~ 9.5 (cc/1,000st)		2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,550	15.1~21.1 (cc/1,000st)		4.0
1-7 Load-timer adjustment	1,250	T-0.6± 0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	500	750	1,250	2,100
	mm	0.6~ 1.8	1.4~ 2.6	3.3~ 4.1	6.6~ 7.8
2-2 Supply pump	N = rpm	600	1,250	2,100	
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.5~ 7.1	
2-3 Overflow delivery	N = rpm	1,250			
	cc/10s	48.0~92.0			

### 2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	44.8~46.8		
	600	42.3~46.3		
	2,100	37.2~41.2		
	2,550	14.6~21.6		
	2,900	Below 5.0		
Switch OFF	375	0		
Idling position	600	Below 3.0		
	375	6.0~10.0		

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.1~1.3	mm
BCS	-	mm

### Control lever angle

α	19.0~27.0	deg
A	12.4~17.8	mm
β	41.0~51.0	deg
B	12.1~16.1	mm
Y	-	deg
C	-	mm

2-5 Solenoid  
 Max.cut-in voltage : 8 V  
 Test voltage : 12~14 V

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg  
 Pump Speed : 1,250 rpm  
 Fuel Injection : 35.7±1 cc/1000st  
 Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/2 )

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1,250	34.7~36.7	-	(3.1)	0.2~1.0
1,250	26.7~29.7	-	(2.3)	0.8~2.0

# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : 4D56T

Injection pump No: 104640-3390 [NP-VE4/10F2100RNP462]

BOSCH No.9 460 610 236

DKKC No. 104740-3700

Date : 30.May.1987 0

Company : MITSUBISHI

No. MD106428

104740-3700

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~ 3.9 (mm)	540~560	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	540~560	
1-3 Full load delivery with charge air pressure	1,250	61.4~62.4 (cc/1,000st)	540~560	4.5
Full load delivery with charge air pressure	750	60.4~61.4 (cc/1,000st)	320~340	
1-4 Idle speed regulation	375	6.5~ 9.5 (cc/1,000st)	0	2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,650	22.2~28.2 (cc/1,000st)	540~560	5.5
1-7 Load-timer adjustment	1,250	T-0.6± 0.2 (mm)	540~560	
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	500	750	1,250	2,100
	mm	0.6~ 1.8	1.4~ 2.6	3.3~ 4.1	6.6~ 7.8
2-2 Supply pump	N = rpm	600	1,250	2,100	
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.5~ 7.1	
2-3 Overflow delivery	N = rpm	1,250			
	cc/10s	48.0~92.0			

### 2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	60.9~62.9	540~560	
	600	45.8~50.8	0	
	750	59.9~61.9	320~340	
	2,100	52.8~57.8	540~560	
	2,650	20.2~30.2	540~560	
	3,050	Below 5.0	540~560	

Switch OFF	375	0	0	
Idling position	600	Below 3.0	0	
	375	6.0~10.0	0	

2-5 Solenoid Max.cut-in voltage : 8 V  
Test voltage : 12~14 V

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.6~3.8	mm

#### Control lever angle

α	19.0~27.0	deg
A	10.5~16.0	mm
β	40.0~50.0	deg
B	12.1~16.1	mm
γ	—	deg
C	—	mm

○ Note

■ After adjustment of full load fuel injection quantity ( 1250 rpm ), set the boost pressure at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and at pump speed of 750 rpm adjust the fuel injection quantity using the BCS spring set screw.

■ To adjust the timer stroke, supply boost pressure of 550 mmHg ( 0.75 kg/cm<sup>2</sup> ), move the control lever to a position where the full-load injection quantity can be obtained, and then adjust the timer stroke.

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 540~560 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 50.3±0.5 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values ( Item 1 / 7 )

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	49.3~51.3	540~560	(3.1)	0.2~1.0
1250	38.7~41.7	540~560	(2.3)	0.8~2.0

# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
I S O 4113 or  
S A E J967d

ENGINE MODEL : 4D56T

BOSCH No.9 460 610 237  
DKKC No. 104740-3710  
Date : 30.May.1987 (0)  
Company : MITSUBISHI  
No. MD106446

104740-3710

Injection pump No: 104640-3390 [NP-VE4/10F2100RNP462]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : — mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~3.9 (mm)	540~560	
1-2 Supply pump pressure	1,250	4.5~5.1 (kg/cm <sup>2</sup> )	540~560	
1-3 Full load delivery with charge air pressure	1,250	61.4~62.4 (cc/1,000st)	540~560	4.5
Full load delivery with charge air pressure	750	60.4~61.4 (cc/1,000st)	320~340	
1-4 Idle speed regulation	375	6.5~9.5 (cc/1,000st)	0	2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,650	22.2~28.2 (cc/1,000st)	540~560	5.5
1-7 Load-timer adjustment	1,250	T-0.6±0.2 (mm)	540~560	
1-8				

## 2. Test Specifications

2-1 Timing device	N = rpm mm	500 0.6~1.8	750 1.4~2.6	1,250 3.3~4.1	2,100 6.6~7.8
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	600 2.9~3.5	1,250 4.5~5.1	2,100 6.5~7.1	
2-3 Overflow delivery	N = rpm cc/10s	1,250 48.0~92.0			
2-4 Fuel injection quantities	Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position		1,250	60.9~62.9	540~560	
		600	45.8~50.8	0	
		750	59.9~61.9	320~340	
		2,100	52.8~57.8	540~560	
		2,650	20.2~30.2	540~560	
		3,050	Below 5.0	540~560	
Switch OFF		375	0	0	
Idling position		600	Below 3.0	0	
		375	6.0~10.0	0	
2-5 Solenoid		Max.cut-in voltage : 8 V Test voltage : 12~14 V			

## 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.6~3.8	mm

### Control lever angle

α	19.0~27.0	deg
A	10.5~16.0	mm
β	40.0~50.0	deg
B	12.1~16.1	mm
γ	—	deg
C	—	mm

### Note

■ After adjustment of full load fuel injection quantity ( 1250 rpm ), set the boost pressure at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and at pump speed of 750 rpm adjust the fuel injection quantity using the BCS spring set screw.

■ To adjust the timer stroke, supply boost pressure of 550 mmHg ( 0.75 kg/cm<sup>2</sup> ), move the control lever to a position where the full-load injection quantity can be obtained, and then adjust the timer stroke.

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 540~560 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 50.3±0.5 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values ( Item 1 / 7 )

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	49.3~51.3	540~560	(3.1)	0.2~1.0
1250	38.7~41.7	540~560	(2.3)	0.8~2.0

**INJ. PUMP CALIBRATION DATA**  
**Distributor-type**

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : 4D56T

BOSCH No.9 460 610 238 1/3  
DKKC No. 104740-3720  
Date : 30.May.1987  
Company : MITSUBISHI  
No. MD106429

Injection pump No: 104640-3400 [NP-VE4/10F2100RNP463]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~3.9 (mm)	540~560	
1-2 Supply pump pressure	1,250	4.5~5.1 (kg/cm <sup>2</sup> )	540~560	
1-3 Full load delivery with charge air pressure	1,250	61.4~62.4 (cc/1,000st)	540~560	4.5
Full load delivery with charge air pressure	750	60.4~61.4 (cc/1,000st)	320~340	
1-4 Idle speed regulation	375	6.5~9.5 (cc/1,000st)	0	2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,650	22.2~28.2 (cc/1,000st)	540~560	5.5
1-7 Load-timer adjustment	1,250	T-0.6±0.2 (mm)	540~560	
1-8				

**2. Test Specifications**

2-1 Timing device	N = rpm	500	750	1,250	2,100
	mm	0.6~1.8	1.4~2.6	3.3~4.1	6.6~7.8
2-2 Supply pump	N = rpm	600	1,250	2,100	
	kg/cm <sup>2</sup>	2.9~3.5	4.5~5.1	6.5~7.1	
2-3 Overflow delivery	N = rpm	1,250			
	cc/10s	48.0~92.0			

**2-4 Fuel injection quantities**

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	60.9~62.9	540~560	
	600	45.8~50.8	0	
	750	59.9~61.9	320~340	
	2,100	52.8~57.8	540~560	
	2,650	20.2~30.2	540~560	
	3,050	Below 5.0	540~560	
Switch OFF	375	0	0	
Idling position	600	Below 3.0	0	
	375	6.0~10.0	0	

2-5 Solenoid Max.cut-in voltage : 8 V  
Test voltage : 12~14 V

**3. Dimensions**

K	3.2~3.4 mm
KF	5.7~5.9 mm
MS	0.9~1.1 mm
BCS	3.6~3.8 mm

**Control lever angle**

α	19.0~27.0 deg
A	10.5~16.0 mm
β	40.0~50.0 deg
B	12.1~16.1 mm
Y	— deg
C	— mm

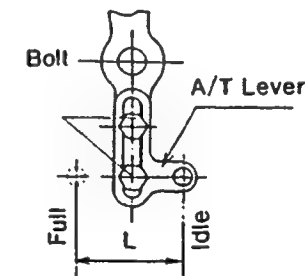
○ Note

■ After adjustment of full load fuel injection quantity ( 1250 rpm ) , set the boost pressure at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and at pump speed of 750 rpm adjust the fuel injection quantity using the BCS spring set screw.

■ To adjust the timer stroke, supply boost pressure of 550 mmHg ( 0.75 kg/cm<sup>2</sup> ) , move the control lever to a position where the full-load injection quantity can be obtained, and then adjust the timer stroke.

■ A/T LINK LEVER ADJUSTMENT

- ① Move the control lever from the idling position to the full speed position and confirm that the A/T lever stroke (L) is 32.9 ± 1 mm.
- ② If dimension L is not as specified, loosen the bolt and adjust by altering the A/T lever position.
- ③ After adjustment, securely tighten the bolt.



■ LOAD TIMER ADJUSTMENT

1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

- Boost Pressure : 540~560 mmHg
- Pump Speed : 1250 rpm
- Fuel Injection Quantity :  $50.3 \pm 0.5$  cc/1000st

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1 / 7)

2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	49.3~51.3	540~560	(3.1)	0.2~1.0
1250	38.7~41.7	540~560	(2.3)	0.8~2.0

**INJ. PUMP CALIBRATION DATA**  
**Distributor-type**

BOSCH No. 9 460 610 239

104740-3760

TEST OIL:  
I S O 4113 G7  
S A E J967d

ENGINE MODEL : 4D56

DKKC No. 104740-3760

Date : 30.May.1987

Company : MITSUBISHI

No. MD120184

Injection pump No: 104640-3430 [NP-VE4/10F2000RNP515]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.5~ 3.9 (mm)		
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,250	45.3~46.3 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	375	6.5~ 9.5 (cc/1,000st)		2.0
1-5 Start	100	63.0~83.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,150	15.1~21.1 (cc/1,000st)		4.0
1-7 Load-timer Adjustment	1,250	T=0.4~ 0.8 (mm)		
1-8				

**2. Test Specifications**

2-1 Timing device	N = rpm mm	500 0.6~ 1.8	750 1.4~ 2.6	1,250 3.3~ 4.1	2,000 6.2~ 7.4
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	600 2.9~ 3.5	1,250 4.5~ 5.1	2,000 6.3~ 6.9	
2-3 Overflow delivery	N = rpm cc/10s	1,250 48.0~92.0			

2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	44.8~46.8		
	600	42.3~46.3		
	2,000	37.2~41.2		
	2,150	13.1~23.1		
	2,500	Below 5.0		
Switch OFF	375	0		
Idling position	375	6.0~10.0		
	600	Below 3.0		

**3. Dimensions**

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.1~1.3	mm
BCS	-	mm

Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	39.0~49.0	deg
B	11.7~15.7	mm
γ	-	deg
C	-	mm

2-5 Solenoid Max.cut-in voltage : 8 V  
Test voltage : 12~14 V

**LOAD TIMER ADJUSTMENT**

1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 1250 rpm

Fuel Injection : 35.2~36.2cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1 / 2)

2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Pump speed (rpm)	Control lever position		Specified Values	
	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.7~36.7	-	(3.1)	0.2~1.0
1250	26.7~29.7	-	(2.3)	0.8~2.0

### INJ. PUMP CALIBRATION DATA Distributor-type

TEST OIL:  
I S O 4113 or  
S A E J967d

ENGINE MODEL : SD25

Injection pump No: 104640-4280 (NP-VE4/10F2100RNP152)

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

BOSCH No.9 460 610 229

DKKC No. 104740-4280

Date : 30.May.1987 (0)

Company : NISSAN DIESEL

No. 16700 T8271

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,000	1.5~ 1.9 (mm)		
1-2 Supply pump pressure	1,000	4.0~ 4.6 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,000	37.9~38.9 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	300	4.5~ 8.5 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,250	11.7~17.7 (cc/1,000st)		
1-7				
1-8				

#### 2. Test Specifications

2-1 Timing device	N = rpm	1,000	1,400	2,100
	mm	1.4~ 2.0	3.2~ 4.4	6.9~ 7.9
2-2 Supply pump	N = rpm	600	1,000	2,100
	kg/cm <sup>2</sup>	3.1~ 3.7	4.0~ 4.6	6.6~ 7.2
2-3 Overflow delivery	N = rpm	1,000		
	cc/10s	8.0~52.0		

#### 2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,000	37.4~39.4		
	600	31.2~35.2		
	2,100	32.9~37.1		
	2,250	11.2~18.2		
	2,350	Below 5.0		
Switch OFF	300	0		
Idling position	300	4.5~ 8.5		
	350	Below 3.0		

2-5 Solenoid Max.cut-in voltage : 16 V  
Test voltage : 24~26 V

#### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.1~1.3	mm
BCS	-	mm
Control lever angle		
α	21.0~29.0	deg
A	4.0~ 9.2	mm
β	37.0~47.0	deg
B	10.7~14.8	mm
Y	-	deg
C	-	mm

### INJ. PUMP CALIBRATION DATA Distributor-type

TEST OIL:  
I S O 4113 or  
S A E J967d

ENGINE MODEL : SD23

Injection pump No: 104640-4620 (NP-VE4/10F2150RNP328)

Pump rotation : clockwise-viewed from drive side

Pre-stroke : 0.18~0.22 mm

BOSCH No.9 460 610 224

DKKC No. 104740-4630

Date : 30.May.1987 (0)

Company : NISSAN DIESEL

No. 16700 R8800

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,000	1.5~ 1.9 (mm)		
1-2 Supply pump pressure	1,000	4.0~ 4.6 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,000	35.6~36.6 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	300	4.3~ 8.3 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,450	14.7~20.7 (cc/1,000st)		
1-7				
1-8				

#### 2. Test Specifications

2-1 Timing device	N = rpm	1,000	1,400	2,150
	mm	1.4~ 2.0	2.5~ 3.8	5.6~ 6.8
2-2 Supply pump	N = rpm	1,000	1,400	2,150
	kg/cm <sup>2</sup>	4.0~ 4.6	5.0~ 5.6	6.8~ 7.4
2-3 Overflow delivery	N = rpm	1,000		
	cc/10s	8.0~52.0		

#### 2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,000	35.1~37.1		
	600	30.3~34.3		
	2,150	31.9~35.9		
	2,450	14.2~21.2		
	2,600	Below 5.0		
Switch OFF	300	0		
Idling position	300	4.3~ 8.3		
	350	Below 3.0		

2-5 Solenoid Max.cut-in voltage : 8 V  
Test voltage : 12~14 V

#### 3. Dimensions

K	3.2~3.4	mm
KF	5.65~5.85	mm
MS	1.1~1.3	mm
BCS	-	mm
Control lever angle		
α	21.0~29.0	deg
A	4.0~ 9.2	mm
β	41.0~51.0	deg
B	12.1~16.1	mm
Y	-	deg
C	-	mm

## INJ. PUMP CALIBRATION DATA

### Distributor-type

BOSCH No.9 460 610 220 1/3

104740-4760 2/3

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : SD23

DKKC No. 104740-4760

Date : 30.May.1987 1

Company : NISSAN DIESEL

No. 16700 23G02

Injection pump No: 104640-4760 (NP-VE4/10F2150RNP395)

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : 0.18~0.22 mm

1. Setting		Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1	Timing device travel	1,000	1.5~ 1.9 (mm)		
1-2	Supply pump pressure	1,000	4.0~ 4.6 (kg/cm <sup>2</sup> )		
1-3	Full load delivery without charge air pressure	1,000	35.6~36.6 (cc/1,000st)		3.0
	Full load delivery with charge air pressure		(cc/1,000st)		
1-4	Idle speed regulation	300	4.3~ 8.3 (cc/1,000st)		2.0
1-5	Start	100	45.0~80.0 (cc/1,000st)		
1-6	Full-load speed regulation	2,335	9.1~15.1 (cc/1,000st)		
1-7					
1-8					

### 2. Test Specifications

2-1	Timing device	N = rpm	1,000	1,400	2,150
		mm	1.4~ 2.0	2.6~ 3.8	5.6~ 6.8
2-2	Supply pump	N = rpm	1,000	1,400	2,150
		kg/cm <sup>2</sup>	4.0~ 4.6	5.0~ 5.6	6.8~ 7.4
2-3	Overflow delivery	N = rpm	1,000		
		cc/10s	8.0~52.0		

2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,000	35.1~37.1		
	600	30.3~34.3		
	2,050	32.3~36.3		
	2,335	8.6~15.6		
	2,500	Below 5.0		
Switch OFF	300	0		
Idling position	300	4.3~ 8.3		
	350	Below 3.0		
2-5 Solenoid	Max.cut-in voltage : 8 V Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.65~5.85	mm
MS	1.1~1.3	mm
BCS	—	mm

#### Control lever angle

$\alpha$	21.0~29.0	deg
A	4.0~ 9.2	mm
$\beta$	37.0~47.0	deg
B	10.7~14.8	mm
Y	—	deg
C	—	mm

### W-CSD Adjustment

#### 1) Timer Stroke Adjustment

1. Calculate the timer stroke from Fig. 2 according to the atmospheric temperature at the time of adjustment.
2. Adjust using the timer stroke adjusting screw so that the timer stroke is as calculated in Step 1.

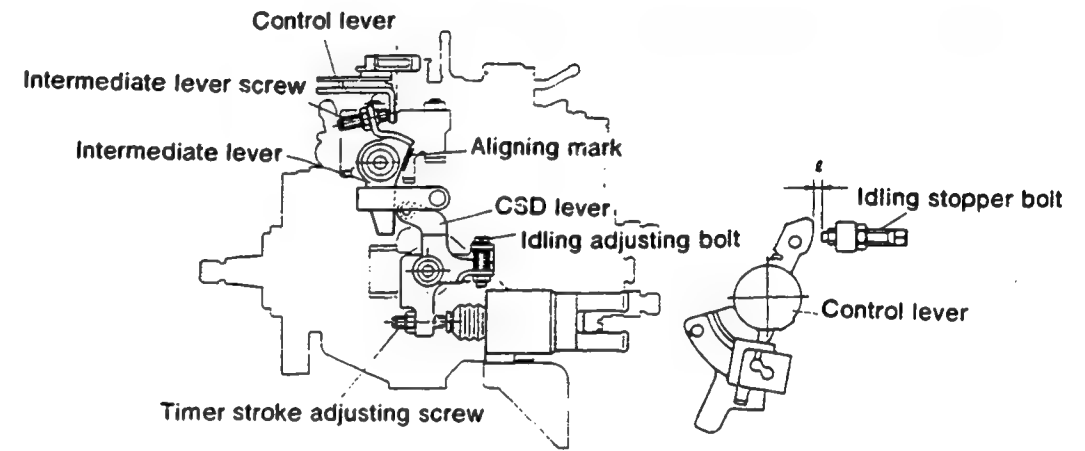


Fig. 1

#### 2) Intermediate Lever Position Adjustment

1. Insert a block gauge (thickness gauge) of  $1.9 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
2. Align the intermediate lever with the aligning mark.
3. Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.



3) CSD Lever Adjustment

1. Calculate the block gauge dimension  $\ell \pm 0.05\text{mm}$  from Fig. 2 according to the atmospheric temperature at the time of adjustment.
2. Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
3. Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

(Note)

1. The temperature of the wax must be below  $30^\circ\text{C}$  when adjusting.
2. When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.

Formula for calculating Fig. 2

Formula for calculating timer stroke:

When  $-10 \leq t(^{\circ}\text{C}) \leq 20$  :  $T = -0.055t + 1.1$

When  $20 \leq t(^{\circ}\text{C}) \leq 40$  :  $T = -0.0333t + 0.66$

Formula for calculating control lever and idling stopper bolt gap:

When  $-10 \leq t(^{\circ}\text{C}) \leq 20$  :  $\ell = -0.0867t + 3.63$

When  $20 \leq t(^{\circ}\text{C}) \leq 40$  :  $\ell = -0.075t + 3.4$

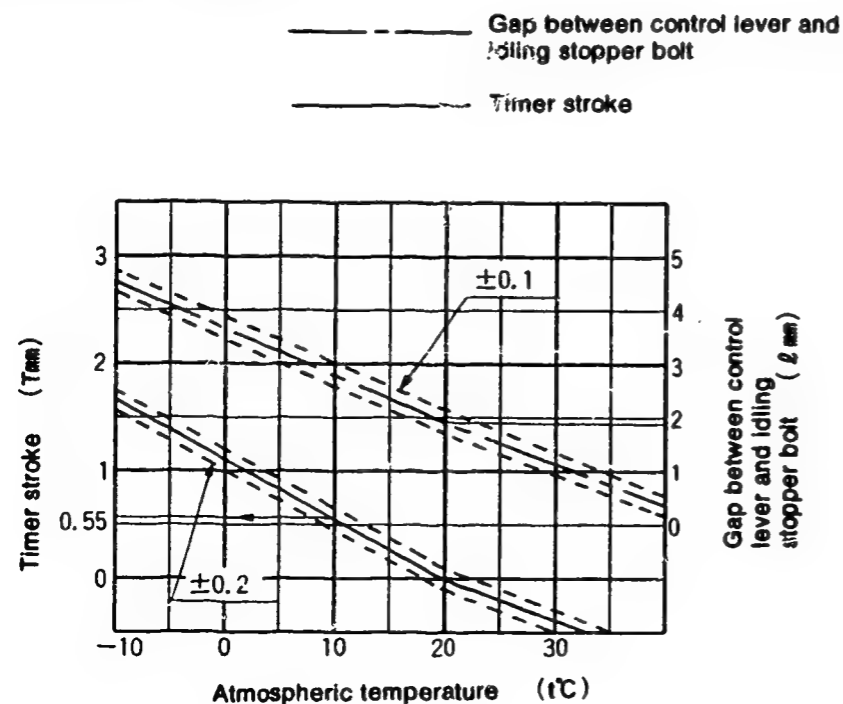


Fig. 2

# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
I S O 4113 cr  
S A E J967d

ENGINE MODEL : TD23

BOSCH No.9 460 610 240  
DKKC No. 104740-9340  
Date : 30.May.1987 ①  
Company : NISSAN DIESEL  
No. 16700 02N14

104740-9340

Injection pump No: 104640-9340 (NP-VE4/10F2150RNP510)

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : — mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,700	4.4~ 4.8 (mm)		
1-2 Supply pump pressure	1,700	4.9~ 5.5 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,100	44.1~45.1 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	350	4.5~ 8.5 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,350	28.3~32.3 (cc/1,000st)		
1-7				
1-8				

2. Test Specifications		Solenoid timer	OFF			ON
2-1 Timing device	N = rpm mm	1,100 2.0~ 3.0	1,700 4.3~ 4.9	2,550 0.4~ 7.4	1,700 5.5~ 7.4	
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	1,100 3.5~ 4.1	1,700 4.9~ 5.5	2,150 5.8~ 6.4		
2-3 Overflow delivery	N = rpm cc/10s	1,100 43.0~87.0	(Solenoid timer : ON)			
2-4 Fuel injection quantities						
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)		
Full speed position	1,100	43.6~45.6				
	600	41.5~45.5				
	2,150	35.9~40.1				
	2,350	27.8~32.8				
	2,550	5.3~12.4				
	2,700	Below 5.0				
Switch OFF	350	0				
Idling position	350	4.5~ 8.5				
	450	Below 2.0				
2-5 Solenoid						
Max.cut-in voltage : 8 V						
Test voltage : 12~14 V						

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	—	mm

#### Control lever angle

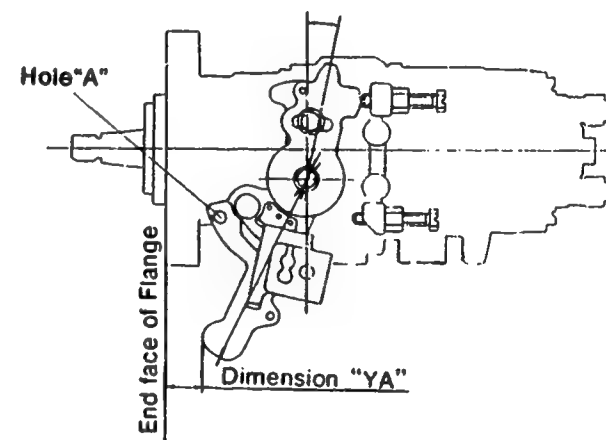
α	50.0~58.0	deg
YA	23.7~28.3	mm
β	37.0~47.0	deg
B	10.7~14.8	mm
γ	—	deg
C	—	mm

○ Note

■ If there is no designation in the specifications for the Solenoid Timer's ON-OFF position, then the position should be regarded as OFF.

■ Control Lever Angle Measurement Position

① Measure the control lever angles (α, β, γ) at hole A.



## INJ. PUMP CALIBRATION DATA Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : TD23

BOSCH No.9 460 610 241  
DKKC No. 104740-9351  
Date : 30.May.1987 2  
Company : NISSAN DIESEL  
No. 16700 02N19

104740-9351

Injection pump No: 104640-9351 (NP-VE4/10F2150RNP511)

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,100	2.3~ 2.7 (mm)		
1-2 Supply pump pressure	1,100	3.5~ 4.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,100	44.1~45.1 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	350	4.5~ 8.5 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,350	28.3~32.3 (cc/1,000st)		
1-7				
1-8				

2. Test Specifications		Solenoid timer	OFF			ON
2-1 Timing device	N = rpm	1,100	1,700	2,550	1,100	
	mm	2.2~ 2.8	4.1~ 5.1	6.4~ 7.4	3.7~ 4.7	
2-2 Supply pump	N = rpm	1,100	1,700	2,150		
	kg/cm <sup>2</sup>	3.5~ 4.1	4.9~ 5.5	5.8~ 6.4		
2-3 Overflow delivery	N = rpm		1,100			
	cc/10s		43.0~87.0			
2-4 Fuel injection quantities						
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)		
Full speed position	1,100	43.6~45.6				
	600	41.5~45.5				
	2,150	35.9~40.1				
	2,350	27.8~32.8				
	2,550	5.3~12.4				
	2,700	Below 5.0				
Switch OFF	350	0				
Idling position	350	4.5~ 8.5				
	450	Below 2.0				
2-5 Solenoid						
		Max.cut-in voltage : 8 V				
		Test voltage : 12~14 V				

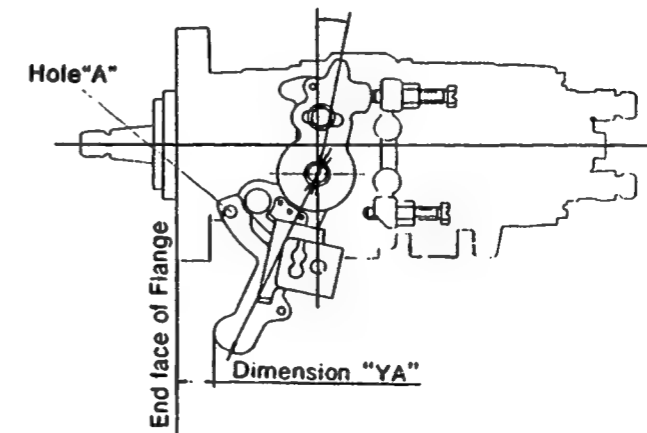
3. Dimensions		
K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.8~1.1	mm
BCS	-	mm
Control lever angle		
$\alpha$	50.0~58.0	deg
YA	23.7~28.3	mm
$\beta$	37.0~47.0	deg
B	10.7~14.8	mm
$\gamma$	-	deg
C	-	mm

○ Note

■ If there is no designation in the specifications for the Solenoid Timer's ON-OFF position, then the position should be regarded as OFF.

■ Control Lever Angle Measurement Position

① Measure the control lever angles ( $\alpha, \beta, \gamma$ ) at hole A.



## INJ. PUMP CALIBRATION DATA

### Distributor-type

ENGINE MODEL : TD23

BOSCH No.9 460 610 242

DKKC No. 104740-9371

Date : 30.May.1987 2

Company : NISSAN DIESEL

No. 16700 10T07

104740-9371

TEST OIL:  
ISO 4113 or  
SAE J967d

Injection pump No: 104640-9371 [NP-VE4/10F2150RNP513]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,100	2.3~ 2.7 (mm)		
1-2 Supply pump pressure	1,100	3.5~ 4.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,100	44.1~45.1 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	350	4.5~ 8.5 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,350	28.3~32.3 (cc/1,000st)		
1-7				
1-8				

2. Test Specifications		Solenoid timer	OFF			ON
2-1	Timing device	N = rpm mm	1,100 2.2~ 2.8	1,700 4.1~ 5.1	2,550 6.4~ 7.4	1,100 3.7~ 4.7
2-2	Supply pump	N = rpm kg/cm <sup>2</sup>	1,100 3.5~ 4.1	1,700 4.9~ 5.5	2,150 5.8~ 6.4	
2-3	Overflow delivery	N = rpm cc/10s	1,100 43.0~87.0			
2-4 Fuel injection quantities						
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)		
Full speed position	1,100	43.6~45.6				
	600	41.5~45.5				
	2,150	35.9~40.1				
	2,350	27.8~32.8				
	2,550	5.3~12.4				
	2,700	Below 5.0				
Switch OFF	350	0				
Idling position	350	4.5~ 8.5				
	450	Below 2.0				
2-5 Solenoid						
		Max.cut-in voltage : 8 V				
		Test voltage : 12~14 V				

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.8~1.1	mm
BCS	-	mm

#### Control lever angle

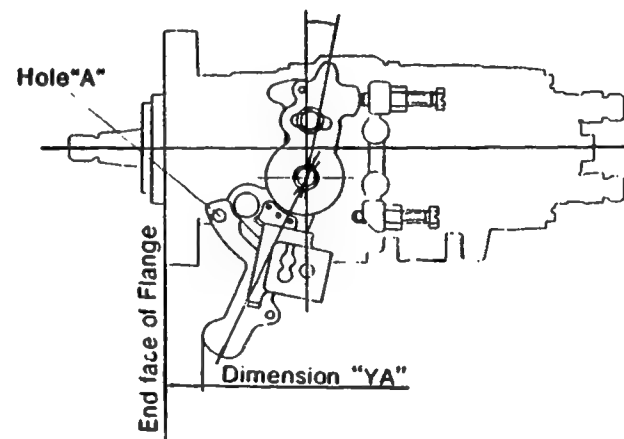
α	50.0~58.0	deg
YA	23.7~28.3	mm
β	37.0~47.0	deg
B	10.7~14.8	mm
Y	-	deg
C	-	mm

○ Note

■ If there is no designation in the specifications for the Solenoid Timer's ON-OFF position, then the position should be regarded as OFF.

■ Control Lever Angle Measurement Position

① Measure the control lever angles (α, β, γ) at hole A.



## INJ. PUMP CALIBRATION DATA

### Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : TD23

Injection pump No: 104640-9540 [NP-VE4/10F2150RNP537]

BOSCH No.9 460 610 243 1/3

DKKC No. 104740-9540

Date : 30.May.1987 1

Company : NISSAN DIESEL

No. 16700 02N18

104740-9540 2/3

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,100	2.3~ 2.7 (mm)		3.0
1-2 Supply pump pressure	1,100	3.5~ 4.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,100	45.1~46.1 (cc/1,000st)		
				(cc/1,000st)
1-4 Idle speed regulation	350	4.5~ 8.5 (cc/1,000st)		2.0
1-5 Start	100	45.0~80.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,350	28.3~32.3 (cc/1,000st)		
1-7				
1-8				

2. Test Specifications		Solenoid timer	OFF			ON
2-1 Timing device	N = rpm	1,100	1,700	2,550	1,100	
	mm	2.2~ 2.8	4.1~ 5.1	6.4~ 7.4	3.7~ 4.7	
2-2 Supply pump	N = rpm	1,100	1,700	2,150		
	kg/cm <sup>2</sup>	3.5~ 4.1	4.9~ 5.5	5.8~ 6.4		
2-3 Overflow delivery	N = rpm	1,100	(Solenoid timer : ON)			
	cc/10s	43.0~87.0				
2-4 Fuel injection quantities						
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)		
Full speed position	1,100	44.6~46.6				
	600	42.1~46.1				
	2,150	36.9~41.1				
	2,350	27.8~32.8				
	2,550	5.3~12.4				
	2,700	Below 5.0				
Switch OFF	350	0				
Idling position	350	4.5~ 8.5				
	450	Below 2.0				
2-5 Solenoid						
	Max.cut-in voltage : 8 V					
	Test voltage : 12~14 V					

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	—	mm

#### Control lever angle

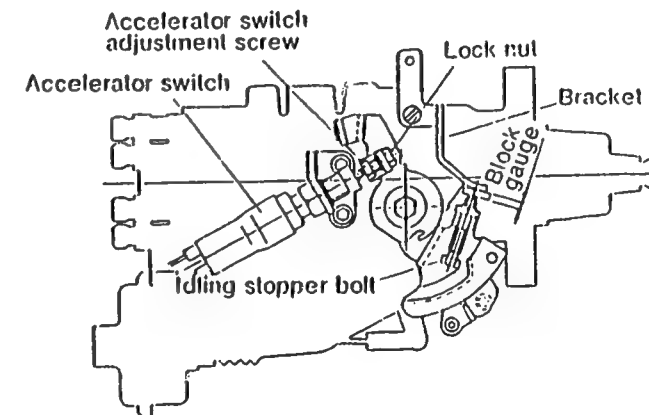
α	50.0~58.0	deg
YA	23.7~28.3	mm
β	37.0~47.0	deg
B	10.7~14.8	mm
γ	—	deg
C	—	mm

○ Note

■ If there is no designation in the specifications Solenoid Timer ON-OFF position, then the position should be regarded OFF.

#### ■ Accelerator Switch Adjustment

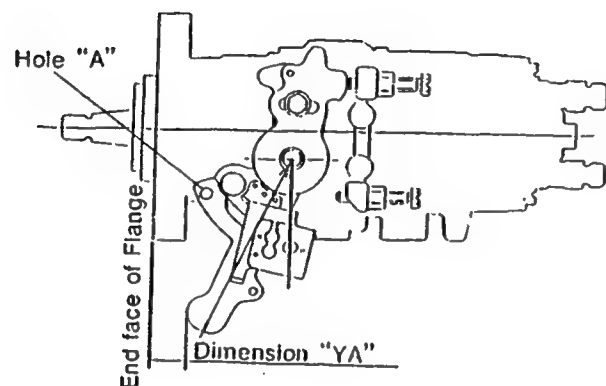
1. Insert a block gauge of  $5.2 \pm 0.13$  mm thickness between the idling stopper bolt and control lever. (Control lever angle :  $8^\circ \pm 2'$  )
2. Then, adjust the accelerator switch using the screw so that it is turned OFF .



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■ Control Lever Angle Measurement Position

Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole A.



## INJ. PUMP CALIBRATION DATA

### Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : RF

Injection pump No: 104648-0244 [NP-VE4/8F2325LNP351]

Pump rotation : Counter clockwise-viewed from drive side

Pre-stroke : - mm

BOSCH No.9 460 610 193 1/5

DKKC No. 104748-0244

Date : 30.May.1987 Q

Company : MAZDA

No. RF39 13 800D

For Test Condition see  
Microfiche No.WP-210(N16)

104748-0244 2/5

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,375	4.0~ 4.4 (mm)		
1-2 Supply pump pressure	1,375	4.4~ 5.0 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,375	35.4~36.4 (cc/1,000st)		2.5
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	410	7.0~ 9.0 (cc/1,000st)		2.0
1-5 Start	100	Above 42.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,600	10.8~14.8 (cc/1,000st)		
1-7 Load-timer adjustment	1,375	3.6± 0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	1,375	1,800	2,325
	mm	3.9~ 4.5	6.1~ 7.3	7.2~ 8.4
2-2 Supply pump	N = rpm	600	1,375	2,325
	kg/cm <sup>2</sup>	2.2~ 2.8	4.4~ 5.0	6.9~ 7.5
2-3 Overflow delivery	N = rpm	1,375		
	cc/10s	46.3~90.3		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,375	34.9~36.9		
	600	29.0~33.0		
	2,325	30.2~34.2		
	2,600	9.8~15.8		
	2,700	Below 6.0		
Switch OFF	410	0		
Idling position	410	6.0~10.0		
2-5 Solenoid	Max cut-in voltage : 8 V	Test voltage : 12~14 V		

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.4~1.6	mm
BCS	-	mm

#### Control lever angle

α	16.0~24.0	deg
A	5.7~10.9	mm
β	40.0~50.0	deg
B	12.7~16.0	mm
Y	-	deg
C	-	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 1,375 rpm

Fuel Injection : 28.2±1 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/5)

#### 2) Confirmation of Timer Characteristics

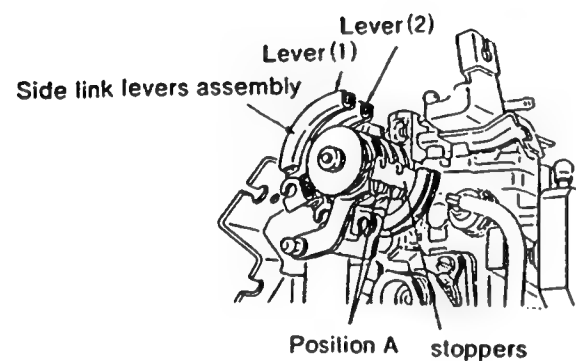
Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1,375	28.2±1.5	-	3.6±0.3	-
1,375	16.1±1.5	-	2.4±0.7	-

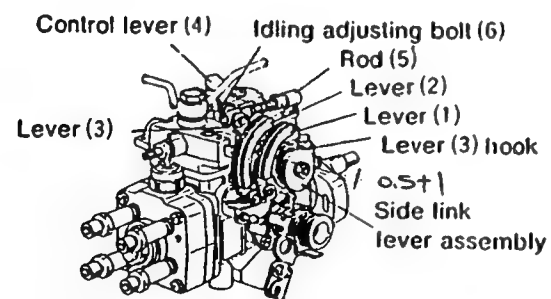
■ Side Link Lever Adjustment

1) Side link lever adjustment

1. Fix the control lever in the idling position.
2. Check that side link levers (1) and (2) contact the stoppers. (Portion A)

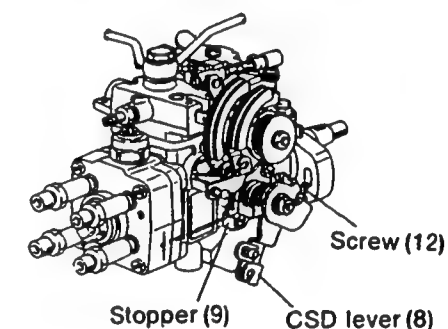
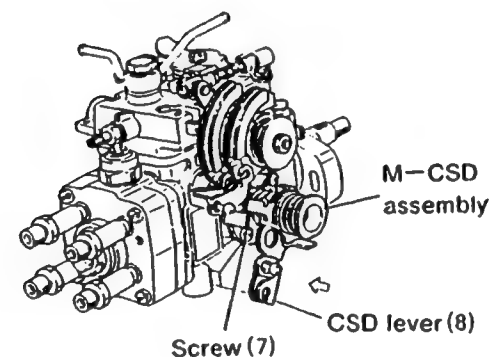


3. If control lever (4) and lever (3) are not connected by rod (5), connect them.
4. After connecting rod (5), adjust the length of rod (5) so that the gap at the hook of lever (3) and levers (1) and (2) is 0.5+1 mm.



2) M-CSD adjustment

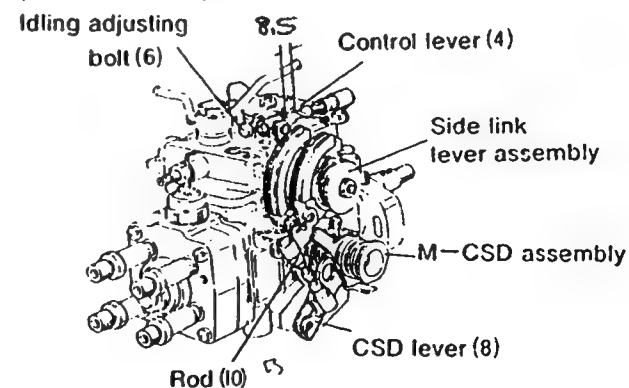
1. Turn the drive shaft two or three turns and set the measuring device at 0.
2. Move the CSD lever gently in the direction of the arrow (advance direction).
3. Fix the CSD lever in a position where the CSD lever shaft ball pin contacts the roller holder. (Move gently, and hold the CSD lever in the position where the resistance changes.)
4. Check that the measuring device is at the 0 point.
5. Adjust the adjusting screw (12) so that the gap between the CSD lever (8) and the stopper (9) is 0.5+2 mm.
6. Turn the drive shaft two or three turns, check the position of the measuring device 0 point, and then recheck the gap between CSD lever (8) and stopper (9).



3) Fixing the CSD lever and side link lever connecting rod

1. Connect the side link lever assembly and CSD lever using rod (10).
2. Move the CSD lever through its full stroke (in the direction the arrow).
3. Adjust the length of rod (10) so that the gap between control lever (4) and idling adjusting bolt (6) is 8.5 mm, and then fix in this position.

(Target engine speed: 1900 rpm)

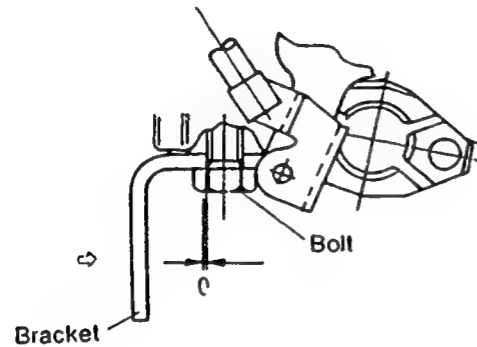




104748-0244 5/5

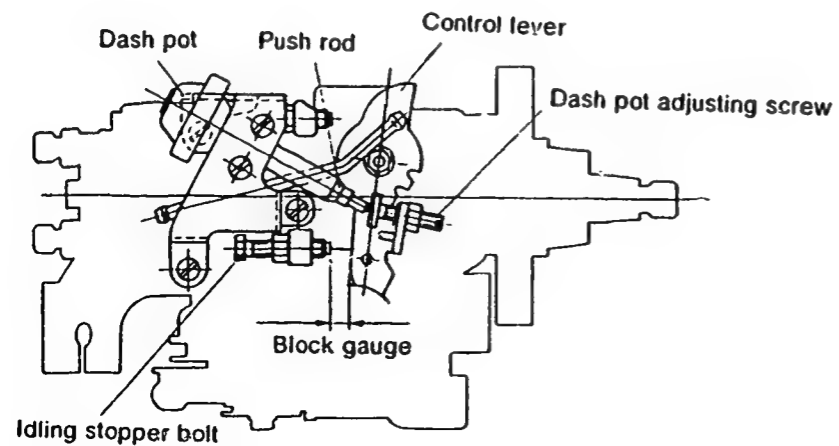
4) Fixing the engine installation bracket

1. Fix the bracket temporarily to the pump.
2. Move the bracket in the direction of the arrow until the clearance is 0.
3. Fix the bracket in position using the bolts.



■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness 8.5 in the gap between the control lever and the idling stopper bolt. (control lever angle : 13° )
- ② With the control lever positioned as described in ① above, adjust the Dashpot adjusting screw so that the Dashpot adjusting screw and the push rod are in contact. Fix using the nut.



# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : CD17

Injection pump No: 104648-2170 [NP-VE4/8F2500LNP134]

BOSCH No.9 460 610 244

DKKC No. 104748-2340

Date : 30.May.1987 [1]

Company : NISSAN

No. 16700 16A08

104748-2340

Pump rotation : Counter clockwise-viewed from drive side

Pre-stroke : - mm

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,200	1.8~ 2.4 (mm)		2.5
1-2 Supply pump pressure	1,200	3.1~ 3.7 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure Full load delivery with charge air pressure	1,200	29.5~30.5 (cc/1,000st) (cc/1,000st)		
1-4 Idle speed regulation	400	8.3~11.3 (cc/1,000st)		
1-5 Start	100	50.0~70.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,700	11.9~17.9 (cc/1,000st)		
1-7				
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	1,200	1,800	2,500
	mm	1.7~ 2.5	4.0~ 5.2	6.8~ 8.0
2-2 Supply pump	N = rpm	1,200	1,800	2,500
	kg/cm <sup>2</sup>	3.0~ 3.8	4.4~ 5.2	6.1~ 6.9
2-3 Overflow delivery	N = rpm	1,200		
	cc/10s	36.0~80.0		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,200	29.0~31.0		
	600	24.8~28.8		
	2,500	26.7~30.7		
	2,700	11.4~18.4		
	2,900	Below 6.0		
Switch OFF	400	0		
Idling position	400	7.8~11.8		2.5
	600	Below 3.0		
Partial load	700	13.3~20.0		
2-5 Solenoid	Max.cut-in voltage : 8 V Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.5~1.7	mm
BCS	-	mm

#### Control lever angle

$\alpha$	1~-1	deg
YA	15.4~18.1	mm
$\beta$	37.0~47.0	deg
B	10.7~14.8	mm
$\gamma$	10.5~11.5	deg
C	6.7~ 7.3	mm

### Control Lever Angle Measurement Position

① Measure the control lever angles ( $\alpha, \beta, \gamma$ ) at hole A.

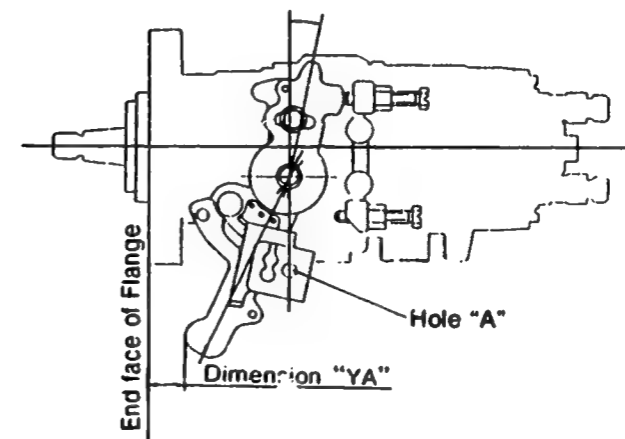
② Marking Positions

The control lever is marked (painted) at the positions shown below, depending on the value of control lever angle  $\beta$ .

Position "a"  $\Rightarrow \beta \leq 39.5^\circ$  (B=11.7mm)

Position "b"  $\Rightarrow 39.5^\circ$  (B=11.7mm)  $< \beta \leq 42.5^\circ$  (B=13.0mm)

Position "c"  $\Rightarrow \beta > 42.5^\circ$  (B=13.0mm)



# INJ. PUMP CALIBRATION DATA

## Distributor-type

BOSCH No.9 460 610 223 1/4  
 DKKC No. 104749-0293  
 Date: 30.May.1987   
 Company: MAZDA  
 No. PN13 13 800D

104749-0293 2/4

TEST OIL:  
 I S O 4113 or  
 S A E J967d

ENGINE MODEL : PN

Injection pump No: 104649-0330 [NP-VE4/9F2350RNP355]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
 Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,500	3.4~ 3.8 (mm)		
1-2 Supply pump pressure	1,500	4.4~ 5.0 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,500	34.6~35.6 (cc/1,000st)		2.5
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	410	5.0~ 7.0 (cc/1,000st)		2.0
1-5 Start	100	55.0~70.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,635	6.0~10.0 (cc/1,000st)		
1-7 Load-timer adjustment	1,500	2.9± 0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	1,000	1,500	2,350	
	mm	0.6~ 1.8	3.3~ 3.9	7.1~ 8.3	
2-2 Supply pump	N = rpm	1,000	1,500	2,350	
	kg/cm <sup>2</sup>	3.0~ 3.6	4.4~ 5.0	6.8~ 7.4	
2-3 Overflow delivery	N = rpm	1,500			
	cc/10s	53.0~97.0			
2-4 Fuel injection quantities	Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
	Full speed position	1,500	34.1~36.1		
		500	30.4~38.4		
		2,350	29.2~33.2		
		2,635	5.0~11.0		
		2,800	Below 3.0		
	Switch OFF	410	0		
	Idling position	410	5.0~ 9.0		
2-5 Solenoid	Max.cut-in voltage : 8 V				
	Test voltage : 12~14 V				

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.4~1.6	mm
BCS	-	mm
Control lever angle		
α	23.0~27.0	deg
A	34.5~37.5	mm
β	38.0~48.0	deg
B	11.9~15.2	mm
γ	-	deg
C	-	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 1500 rpm

Fuel Injection : 31.2±1 cc/1000st  
 Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/4 )

#### 2) Confirmation of Timer Characteristics

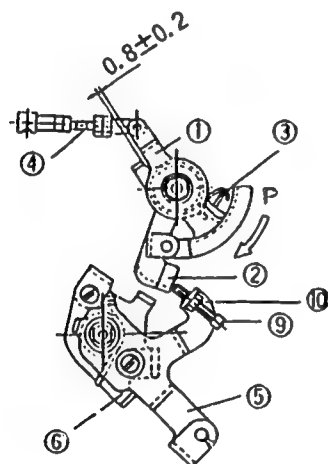
Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1500	31±1.5	-	2.9±0.3	-
1500	22±1.5	-	(1.9)	-

■ Side link lever adjustment

1) Side link lever adjustment

1. Fix the control lever in the idling position.
2. Confirm that the side link lever ② contact the stopper ③ through the springs action.
3. Rotate the side link lever ① gently in P direction so that the connecting rod ④ play is zero mm.
4. Adjust the length of rod ④ so that the gap at the levers ① and ② is  $0.8 \pm 0.2$  mm.
5. Tighten the two nuts on rod ④.

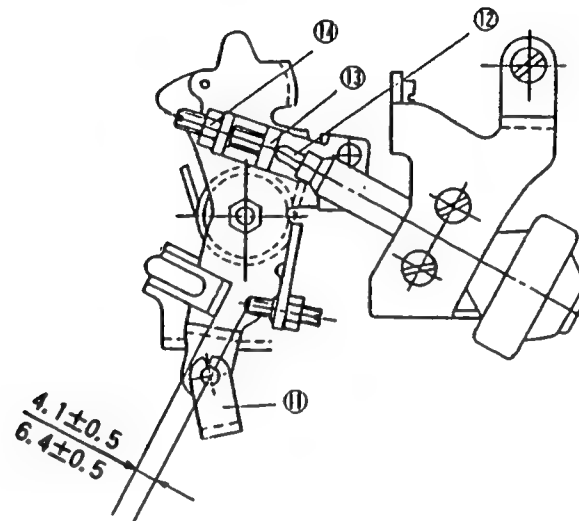


2) Fixing the M-CSD stopper

1. Fix the M-CSD assembly temporarily to the pump housing.
2. Turn the drive shaft at least two turns in the direction of pump rotation.
3. Turn the drive shaft slowly, and fix the drive shaft in a position where a load is applied (the point where the roller in the roller holder contacts the cam surface of the cam disk).
4. Move the CSD lever to the advance side.
5. Fix the CSD lever ⑤ in the position where the ball pin at the tip of the shaft lightly contacts the roller holder (roller holder advance angle "0").
6. Adjust using the adjusting screw ⑦ so that the gap between the CSD lever ⑤ and the stopper ⑥ is  $0.5 \pm 2$  mm.
7. After adjust, tighten the nut ⑧ to the specified torque.  
T = 0.6 to 0.9 kg.m

3) M-CSD Adjustment

1. Move the CSD lever ⑤ through its full stroke.
2. Adjust the screw ⑨ so that the gap between the control lever ⑪ and idling adjusting bolt is  $4.1 \pm 0.5$  mm, and then fix in the this position.



■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $6.4 \pm 0.5$  in the gap between the idling stopper bolt and the bracket. (control lever angle :  $15.2^\circ$ )
- ② With the control lever positioned as described in ① above, adjust the Dashpot adjusting screw ⑭ so that the Dashpot adjusting screw ⑭ and the push rod ⑫ are in contact. Fix using the nut.

# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : PN

BOSCH No.9 460 610 245 1/4

DKKC No. 104749-0322

Date : 30.May.1987

Company : MAZDA

No. PN2213800B

104749-0322 2/4

Injection pump No: 104649-0342 [NP-VE4/9F2350RNP540]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,500	3.7~ 4.1 (mm)		
1-2 Supply pump pressure	1,500	4.4~ 5.0 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,500	35.6~36.6 (cc/1,000st)		2.5
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	410	5.0~ 7.0 (cc/1,000st)		2.0
1-5 Start	100	55.0~75.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,635	6.0~10.0 (cc/1,000st)		
1-7 Load-timer Adjustment	1,500	3.2±0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm mm	1,000 1.0~ 2.2	1,500 3.6~ 4.2	2,350 7.1~ 8.3	
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	1,000 3.0~ 3.6	1,500 4.4~ 5.0	2,350 6.8~ 7.4	
2-3 Overflow delivery	N = rpm cc/10s		1,500 53.0~97.0		
2-4 Fuel injection quantities	Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position		1,500	35.1~37.1		
		500	31.2~39.2		
		2,350	29.3~33.3		
		2,635	5.0~11.0		
		2,800	Below 3.0		
Switch OFF		410	0		
Idling position		410	5.0~ 7.0		
2-5 Solenoid		Max.cut-in voltage : 8 V Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.4~1.6	mm
BCS	-	mm

#### Control lever angle

α	23.0°~27.0°	deg
A	34.5~ 7.5	mm
β	38.0°~48.0°	deg
B	11.9~15.2	mm
γ	-	deg
C	-	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

- ① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 1500 rpm

Fuel Injection : 32.2±1 cc/1000st  
Quantity

- ② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1 / 4)

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1500	32.2±1.5	-	3.2±0.3	-
1500	23.1±1.5	-	(2.2)	-

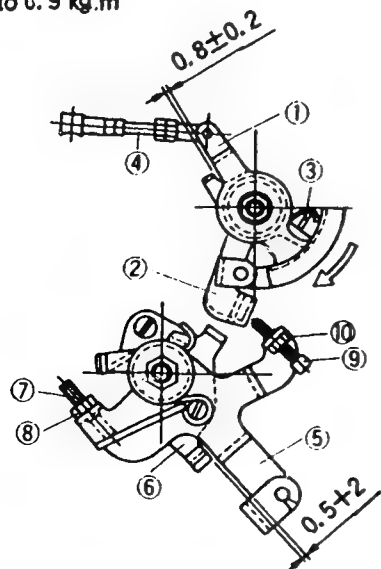
## ■ Side Link Lever Adjustment

### 1) Side Link Lever Adjustment

1. Fix the control lever in the idling position.
2. Move the side link lever ② so that it contacts the stopper ③.
3. Rotate the side link lever ① gently in the direction of P so that the connecting rod ④ play is 0 mm.
4. Adjust the length of rod ④ so that the gap between the levers ① and ② is  $0.8 \pm 0.2$  mm.
5. Tighten the two nuts on rod ④.

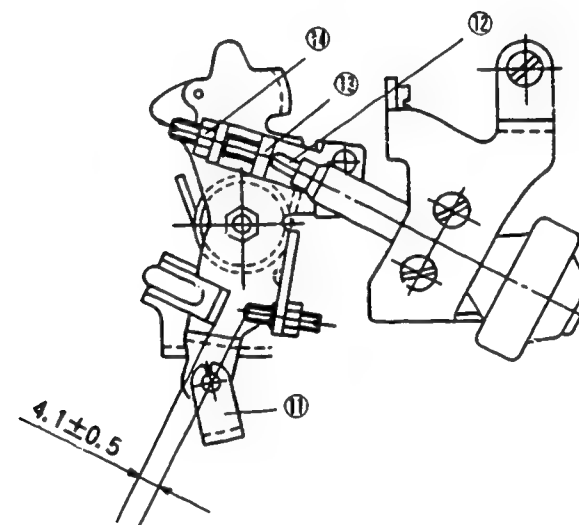
### 2) Fixing the M-CSD Stopper

1. Fix the M-CSD assembly to the pump housing.
2. Turn the drive shaft at least two turns in the direction of pump rotation.
3. Turn the drive shaft slowly, and fix the drive shaft in a position where a load is applied (the point where the roller in the roller holder contacts the cam surface of the cam disk).
4. Move the CSD lever to the advance side.
5. Fix the CSD lever in the position where the ball pin at the tip of the shaft lightly contacts the roller holder (roller holder advance angle "0").
6. Adjust using the adjusting screw ⑦ so that the gap between the CSD lever ⑤ and the stopper ⑥ is  $0.5 \pm 2$  mm.
7. After adjustment, tighten the nut ⑧ to the specified torque.  
Tightening torque : 0.6 to 0.9 kg.m



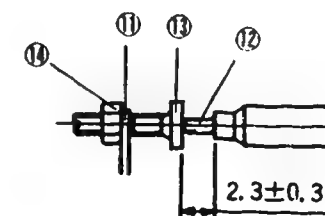
### 3) M-CSD Adjustment

1. Move the M-CSD lever ⑤ through its full stroke.
2. Adjust the screw ⑨ so that the gap between the control lever ⑪ and the idling adjusting bolt is  $4.1 \pm 0.5$  mm, and then fix the screw ⑨ in this position.



## ■ DASHPOT ADJUSTMENT.

1. Fix the control lever (11) in the idling position.
2. Adjust the screw (13) so that the pushrod (12) protrudes  $2.3 \pm 0.3$  mm.



# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
I S O 4113 or  
S A E J967d

ENGINE MODEL : PN

BOSCH No.9 460 610 246 1/4  
DKKC No. 104749-0332  
Date : 30.May.1987  
Company : MAZDA  
No. PN23 13 800B

104749-0332 2/4

Injection pump No: 104649-0380 [NP-VE4/9F2350RNP355]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,500	3.7~ 4.1 (mm)		
1-2 Supply pump pressure	1,500	4.4~ 5.0 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,500	35.6~36.6 (cc/1,000st)		2.5
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	410	5.0~ 7.0 (cc/1,000st)		2.0
1-5 Start	100	55.0~70.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,635	6.0~10.0 (cc/1,000st)		
1-7 Load-timer adjustment	1,500	3.2± 0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	1,000	1,500	2,350
	mm	1.0~ 2.2	3.6~ 4.2	7.1~ 8.3
2-2 Supply pump	N = rpm	1,000	1,500	2,350
	kg/cm <sup>2</sup>	3.0~ 3.6	4.4~ 5.0	6.8~ 7.4
2-3 Overflow delivery	N = rpm		1,500	
	cc/10s		53.0~97.0	
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,500	35.1~37.1		
	500	31.2~39.2		
	2,350	29.3~33.3		
	2,635	5.0~11.0		
	2,800	Below 3.0		
Switch OFF	410	0		
Idling position	410	5.0~ 7.0		
2-5 Solenoid				
	Max.cut-in voltage : 8 V			
	Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.4~1.6	mm
BCS	-	mm

#### Control lever angle

α	23.0°~27.0°	deg
A	34.5~37.5	mm
β	38.0°~48.0°	deg
B	11.9~15.2	mm
γ	-	deg
C	-	mm

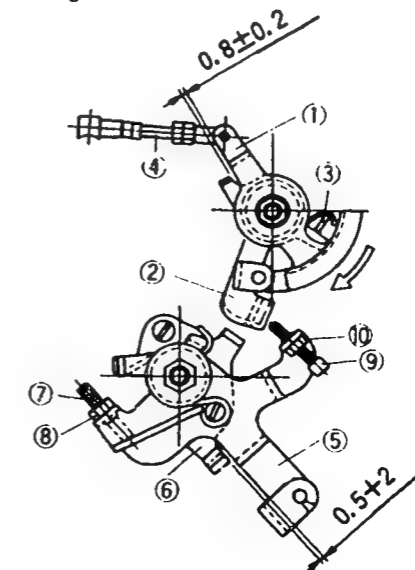
### Side Link Lever Adjustment

#### 1) Side Link Lever Adjustment

1. Fix the control lever in the idling position.
2. Move the side link lever ② so that it contacts the stopper ③.
3. Rotate the side link lever ① gently in the direction of P so that the connecting rod ④ play is 0 mm.
4. Adjust the length of rod ④ so that the gap between the levers ① and ② is  $0.8 \pm 0.2$  mm.
5. Tighten the two nuts on rod ④.

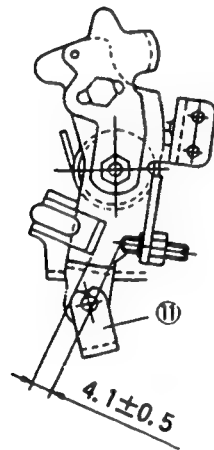
#### 2) Fixing the M-CSD Stopper

1. Fix the M-CSD assembly temporarily to the pump housing.
2. Turn the drive shaft at least two turns in the direction of pump rotation.
3. Turn the drive shaft slowly, and fix the drive shaft in a position where a load is applied (the point where the roller in the roller holder contacts the cam surface of the cam disk).
4. Move the CSD lever to the advance side.
5. Fix the CSD lever in the position where the ball pin at the tip of the shaft lightly contacts the roller holder (roller holder advance angle "0").
6. Adjust using the adjusting screw ⑦ so that the gap between the CSD lever ⑤ and the stopper ⑥ is  $0.5 \pm 2$  mm.
7. After adjustment, tighten the nut ⑧ to the specified torque.  
Tightening torque : 0.6 to 0.9 kg.m



3) M-CSD Adjustment

1. Move the M-CSD lever ⑤ through its full stroke.
2. Adjust the screw ⑨ so that the gap between the control lever ⑪ and the idling adjusting bolt is  $4.1 \pm 0.5$  mm, and then fix the screw ⑨ in this position.



■ LOAD TIMER ADJUSTMENT

1) Adjustment

- ① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : — mmHg  
 Pump Speed : 1500 rpm  
 Fuel Injection Quantity :  $32.2 \pm 1$  cc/1000st

- ② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1 / 4)

2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1500	$32.2 \pm 1.5$	—	$3.2 \pm 0.3$	—
1500	$23.1 \pm 1.5$	—	(2.2)	—



**INJ. PUMP CALIBRATION DATA**  
**Distributor-type**

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : C223

BOSCH No.9 460 610 221

DKKC No. 104749-1131

Date : 30.May.1987 1

Company : ISUZU

No. 8942415623

Injection pump No: 104649-1151 (NP-VE4/9F2175LNP72)

Pump rotation : Counter clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,500	3.8~ 4.2 (mm)		
1-2 Supply pump pressure	1,500	5.2~ 5.6 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,500	37.9~38.9 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	350	5.5~ 9.5 (cc/1,000st)		2.0
1-5 Start	100	Above 63.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,440	10.4~16.4 (cc/1,000st)		
1-7				
1-8				

**2. Test Specifications**

2-1 Timing device	N = rpm mm	1,000 1.4~ 2.6	1,500 3.7~ 4.3	2,175 6.1~ 7.0
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	1,000 3.8~ 4.4	1,500 5.2~ 5.6	2,175 6.6~ 7.2
2-3 Overflow delivery	N = rpm cc/10s	1,000 52.0~95.0		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,500	37.4~39.4		
	600	28.4~32.4		
	2,175	33.3~37.5		
	2,440	10.4~16.4		
	2,550	Below 6.0		
Switch OFF	350	0		
Idling position	350	5.5~ 9.5		
	450	Below 3.0		
2-5 Solenoid	Max.cut-in voltage : 8 V Test voltage : 12~14 V			

**3. Dimensions**

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.7~1.9	mm
BCS	-	mm
Control lever angle		
$\alpha$	21.0~29.0	deg
A	-	mm
$\beta$	36.5~46.5	deg
B	-	mm
Y	-	deg
C	-	mm

**INJ. PUMP CALIBRATION DATA**  
**Distributor-type**

TEST OIL:  
ISO 4113 or  
SAE J987d

ENGINE MODEL : LD20(XP)

BOSCH No.9 460 610 249 1/6

DKKC No. 104749-2191

Date : 30.May.1987 Q

Company : NISSAN

No. 16700 05E21

104749-2191 2/6

Injection pump No: 104649-2191 [NP-VE4/9F2500RNP359]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	900	T=1.3~ 1.7 (mm)		2.5
1-2 Supply pump pressure	900	3.2~ 3.8 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	900	32.5~33.5 (cc/1,000st)		
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	350	4.7~ 7.7 (cc/1,000st)		
1-5 Start	100	40.0~50.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,700	10.9~16.9 (cc/1,000st)		
1-7 Load-timer Adjustment	900	T-0.65±0.2 (mm)		
1-8				

**2. Test Specifications**

2-1 Timing device	N = rpm	900	1,800	2,300
	mm	1.2~ 1.8	5.5~ 6.7	7.7~ 8.9
2-2 Supply pump	N = rpm	900	1,800	2,500
	kg/cm <sup>2</sup>	3.1~ 3.9	5.1~ 5.9	6.8~ 7.6
2-3 Overflow delivery	N = rpm	900		
	cc/10s	35.0~79.0		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	900	32.0~34.0		
	600	31.2~35.2		
	2,300	30.6~34.6		
	2,700	10.4~17.4		
	2,800	Below 6.0		
Switch OFF	350	0		
Idling position	350	4.2~ 8.2		2.5
	500	Below 4.5		
Partial load	900	4.1~14.1		
2-5 Solenoid	Max.cut-in voltage : 8 V Test voltage : 12~14 V			

**3. Dimensions**

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.1~1.3	mm
BCS	-	mm

**Control lever angle**

α	21.0~29.0	deg
A	7.6~11.7	mm
β	38.0~49.0	deg
B	11.9~15.6	mm
γ	10.5~11.5	deg
C	5.5~ 6.1	mm

**LOAD TIMER ADJUSTMENT**

1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 190 rpm

Fuel Injection Quantity : 17±1 cc/1000st

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1 / 6) .

■ W-CSD Adjustment

1) Timer Stroke Adjustment (adjust to the thick line)

1. Calculate the timer stroke from Fig. 2 according to the atmospheric temperature at the time of adjustment.
2. Adjust using the timer stroke adjusting screw so that the timer stroke is as calculated in Step 1.

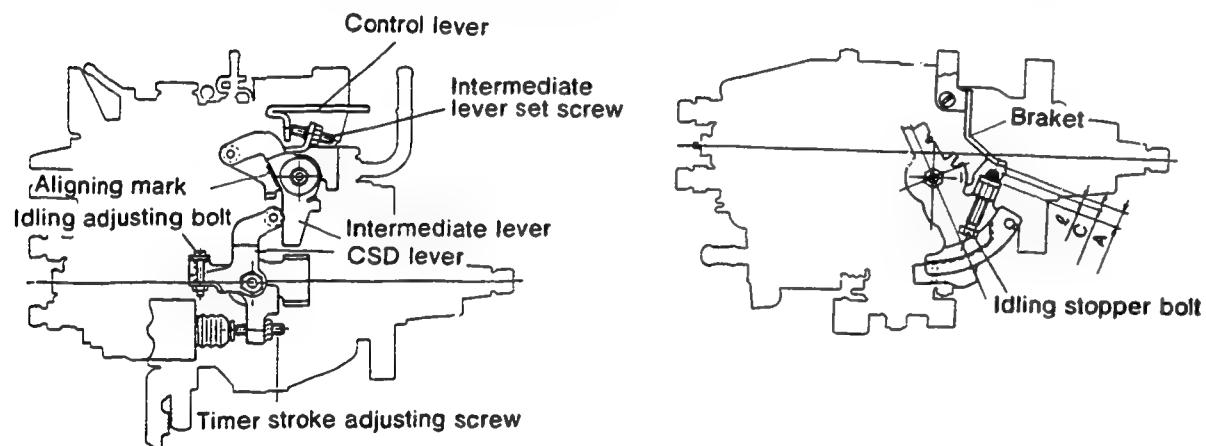


Fig. 1

2) Intermediate Lever Position Adjustment

1. Insert a block gauge (thickness gauge) of  $0.25 \pm 0.05$  mm thickness between the bracket and the idling stopper bolt.
2. Align the intermediate lever with the aligning mark.
3. Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

3) CSD Lever Adjustment (adjust to the thick line)

1. Calculate the block gauge dimension  $l \pm 0.05$ mm from Fig. 2 according to the atmospheric temperature at the time of adjustment.
2. Insert the block gauge (thickness gauge) selected in Step (1) above between the bracket and the idling stopper bolt.
4. Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

4) Final Adjustment

After completing the adjustment, screw the timer stroke adjusting screw two turns clockwise. (Move from the temporary adjustment chart to the final adjustment chart.)

※ This W-CSD's timer stroke operations are effective at atmospheric temperatures of 27°C or above.

Therefore, to make adjustment at normal temperatures possible, after adjusting to the substitute characteristics, tighten the timer stroke adjusting screw two turns.

(Note)

1. The temperature of the wax must be below 30°C when adjusting.
2. When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.

Formula for calculating Fig. 2

Formula for calculating timer stroke:  $T = -0.0367t + 1.424$

Formula for calculating control lever and idling stopper bolt gap:  $g = -0.095t + 3.6$

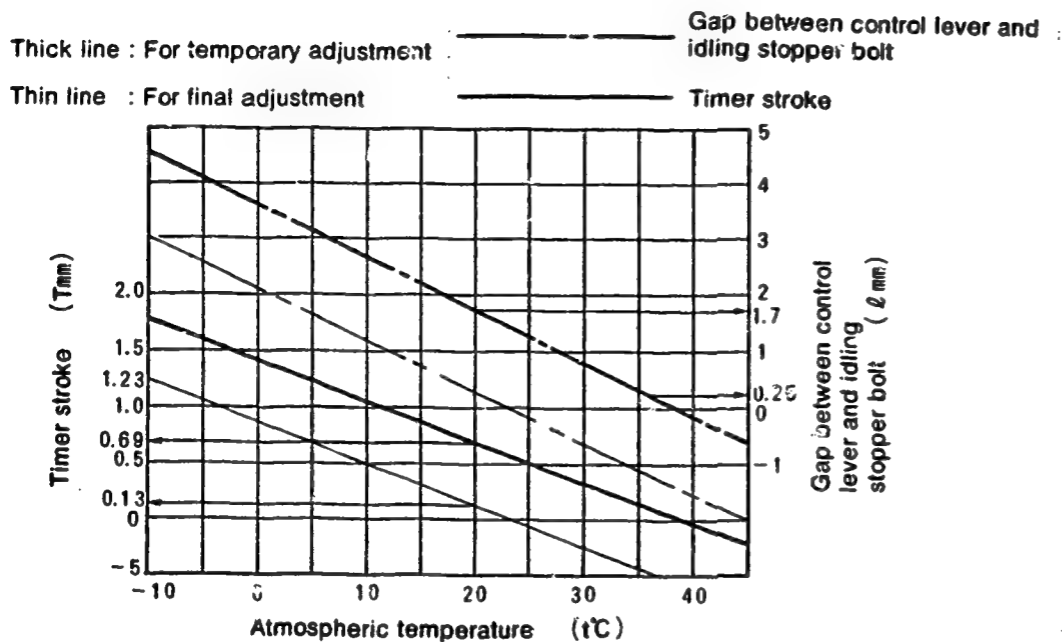
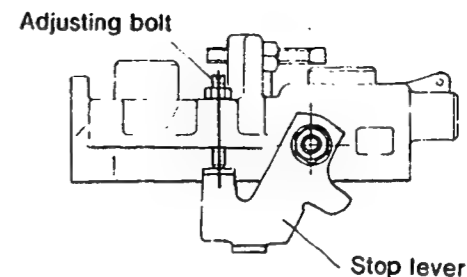


Fig. 2

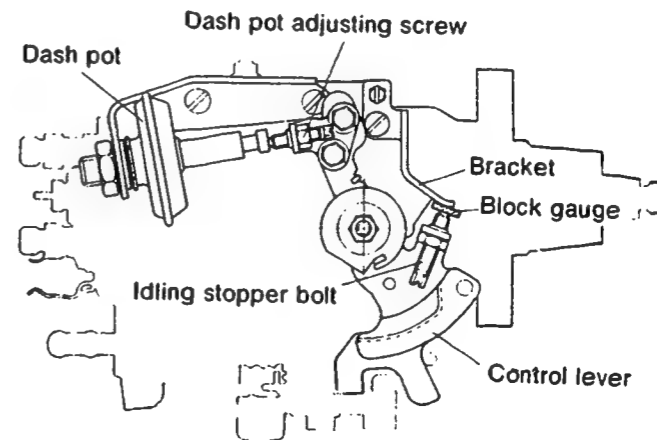
■ Starting Injection Quantity Adjustment

Adjust the starting injection quantity (item 1/5) using the adjusting bolt (as shown in the figure at right).



■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $3.8 \pm 0.05$  mm in the gap between the idling stopper bolt and the bracket.
- ② With the control lever positioned as described in ① above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the push rod are in contact. Fix the screw using the nut.



# INJ. PUMP CALIBRATION DATA

## Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : 4D65T

BOSCH No.9 460 610 197 1/5

DKKC No. 104749-3031

Date : 30.May.1987

Company : MITSUBISHI

No. MD110299

104749-3031 2/5

Injection pump No: 104649-3021 (NP-VE4/9F2250RNP280)

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.9~ 4.3 (mm)	580~600	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	580~600	
1-3 Full load delivery with charge air pressure	1,250	46.3~47.3 (cc/1,000st)	580~600	3.0
Full load delivery with charge air pressure	750	40.2~41.2 (cc/1,000st)	240~260	3.5
1-4 Idle speed regulation	400	5.0~ 8.0 (cc/1,000st)	0	2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,750	3.5~ 9.5 (cc/1,000st)	0	
1-7 Load-timer adjustment	1,250	T-0.6±0.2 (mm)		
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	600	1,250	2,250
	mm	0.7~ 1.9	3.7~ 4.5	7.8~ 8.6
2-2 Supply pump	N = rpm	600	1,250	2,250
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.8~ 7.4
2-3 Overflow delivery	N = rpm	1,250		
	cc/10s	48.0~92.0		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	45.8~47.8	580~600	
	750	39.7~41.7	240~260	
	600	32.7~37.7	0	
	2,250	38.2~43.2	580~600	
	2,750	1.5~11.5	0	
	3,000	Below 3.0	0	
Switch OFF	400	0		
Idling position	600	Below 2.0	0	
	400	4.5~ 8.5	0	
2-5 Solenoid	Max.cut-in voltage : 8 V			
	Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.5~3.7	mm

#### Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	38.0~44.0	deg
B	11.5~14.1	mm
γ	-	deg
C	-	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : - mmHg

Pump Speed : 1250 rpm

Fuel Injection : 33.2±1 cc/1000st

Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/5 )

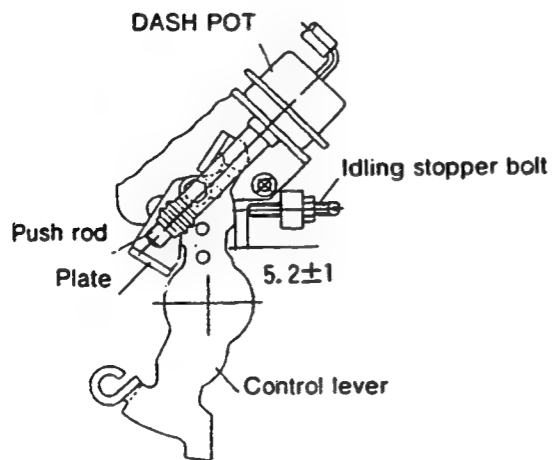
#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	32.2~34.2	-	(3.5)	0.2~1.0
1250	24.2~26.2	-	(2.3~3.5)	(1.2)

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $5.2 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $6^\circ \sim 10^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

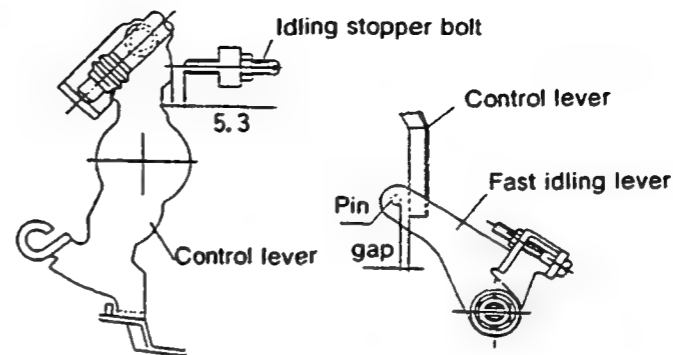


Fig. 1

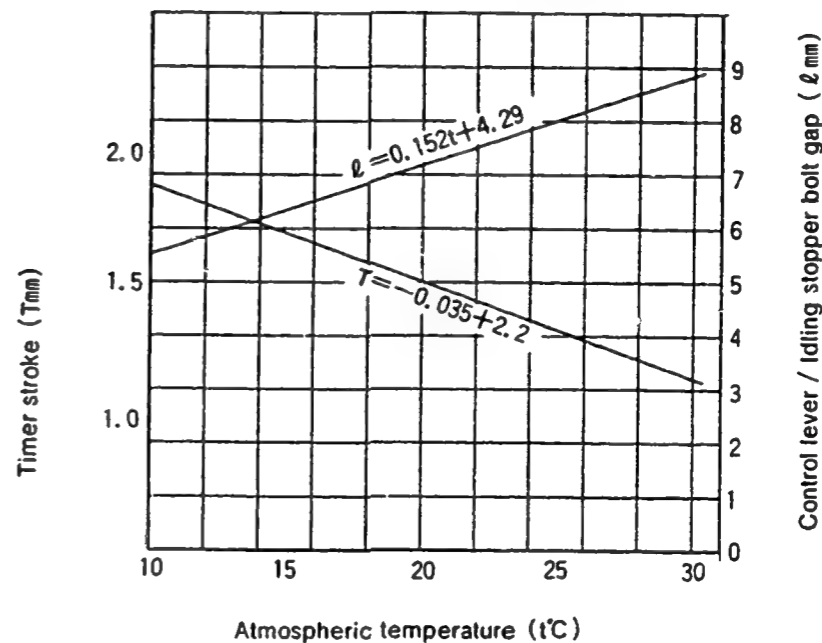


Fig. 2

○ Note

- ① At a pump speed of 1250 rpm and boost pressure of 590 mmHg, adjust the Full Load injection quantity after confirming the boost compensator stoppre's full stroke.
- ② At a pump speed of 750 rpm and boost pressure of 250 mmHg, adjust the full load fuel injection quantity ( 40.2~41.2 cc/1000st) using the BCS spring set screw.

1 ) Timer Stroke Adjustment ( Refer to Fig 1. 2 )

- ① Using the graph ( Fig 2 ) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

2 ) Fast Idle Adjustment ( Refer to Fig 1. 2 )

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.

- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

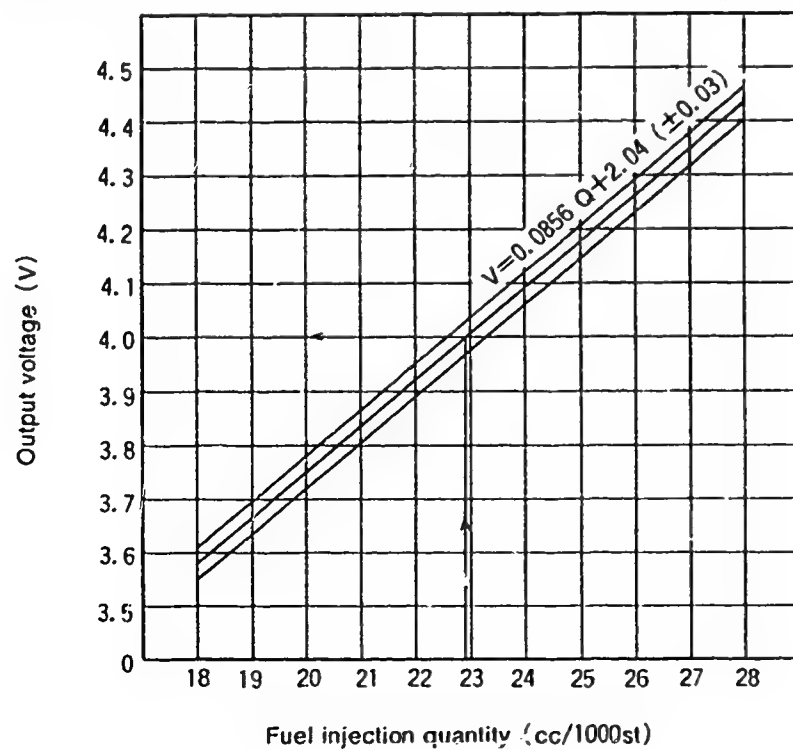
■ **POTENTIOMETER ADJUSTMENT**

Under the following conditions, after potentiometer installation position so that the out-put voltage equale the specified value.

Adjustment Conditions			Specified Value	Remarks
Control lever position	Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Adjustment Value Out-put voltage (V)	
(Approx 19°)	1000	22.9	4±0.03	Adjusting point
Idel	—	—	0.8±0.7	Check point
Full speed	—	—	7.7±1.2	Check point

(In-Put Voltage: 10V)

※ A control lever position of approximately 19°, means that a block gauge of 12.1 mm thickness is inserted between the control lever and the idling stopper bolt.



## INJ. PUMP CALIBRATION DATA

### Distributor-type

BOSCH No.9 460 610 219 1/5  
 DKKC No. 104749-3050  
 Date : 30.May.1987 Q  
 Company : MITSUBISHI  
 No. MD092628

104749-3050 2/5

TEST OIL:  
 ISO 4113 or  
 SAE J967d

ENGINE MODEL : 4D65T

Injection pump No: 104649-3040 [NP-VE4/9F2250RNP336]

Pump rotation : Counter clockwise-viewed from drive side

For Test Condition see  
 Microfiche No.WP-210(N16)

Pre-stroke : - mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.9~ 4.3 (mm)	580~600	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	580~600	
1-3 Full load delivery with charge air pressure	1,250	43.3~44.3 (cc/1,000st)	580~600	3.5
Full load delivery with charge air pressure	750	40.2~41.2 (cc/1,000st)	240~260	3.0
1-4 Idle speed regulation	400	5.0~ 8.0 (cc/1,000st)	0	2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,750	3.5~ 9.5 (cc/1,000st)	0	
1-7 Load-timer adjustment	1,250	T=0.6±0.2 (mm)	0	
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	600	1,250	2,250
	mm	0.7~ 1.9	3.7~ 4.5	7.8~ 8.6
2-2 Supply pump	N = rpm	600	1,250	2,250
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.8~ 7.4
2-3 Overflow delivery	N = rpm	1,250		
	cc/10s	48.0~92.0		

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	42.8~44.8	580~600	
	750	39.7~41.7	240~260	
	600	31.7~36.7	0	
	2,250	35.2~40.2	580~600	
	2,750	1.5~11.5	0	
	3,000	Below 3.0	0	
Switch OFF	400	0	0	
Idling position	600	Below 2.0	0	
	400	4.5~ 8.5	0	

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	2.8~3.0	mm
Control lever angle		
α	55.0~63.0	deg
A	10.5~16.0	mm
β	36.0~46.0	deg
B	10.9~14.8	mm
γ	—	deg
C	—	mm

2-5 Solenoid Max.cut-in voltage : 8 V  
 Test voltage : 12~14 V

Note:

- ① At a pump speed of 1250rpm and boost pressure of 590mmHg, adjust the full Load injection quantity after confirming the boost compensator stoppre's full stroke.
- ② At a pump speed of 750rpm and boost pressure of 250mmHg, adjust the full load fuel injection quantity (40.2~41.2cc/100st) using the boost compensator spring set screw.

### LOAD TIMER ADJUSTMENT

1) Adjustment

- ① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection : 33.2±1 cc/1000st  
 Quantity

- ② With the control lever positioned as described in ① above, adjust the governor sleeve so that Timer Stroke conforms to the specified values (page 1/5).

2) Confirmation of Timer Characteristics

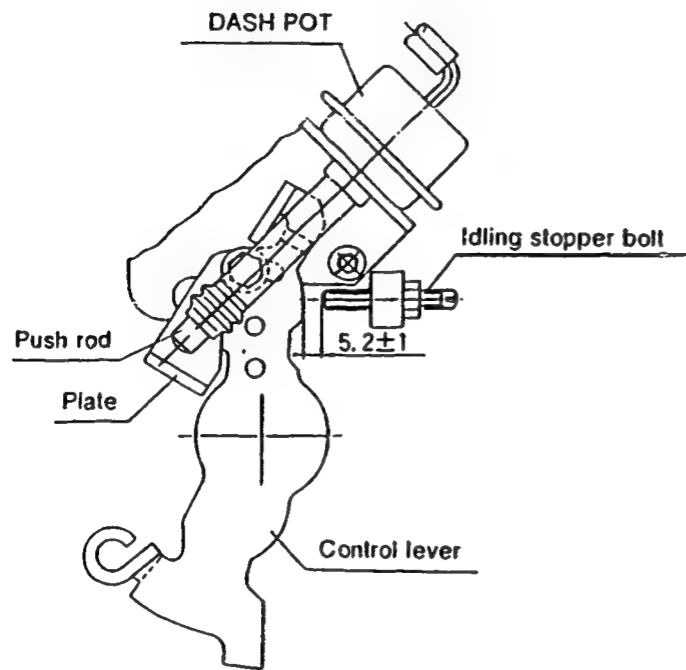
Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	32.2~34.2	0	(3.5)	0.2~1.0
1250	24.2~26.2	0	(2.3~3.5)	(1.2)



○DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $5.2 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $8^\circ \pm 2^\circ$ )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



○W-CSD ADJUSTMENT

1) Timer Stroke Adjustment (Refer to Fig 1.2)

- ① Using the graph (Fig 2), determine the Timer stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$ mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the timer of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

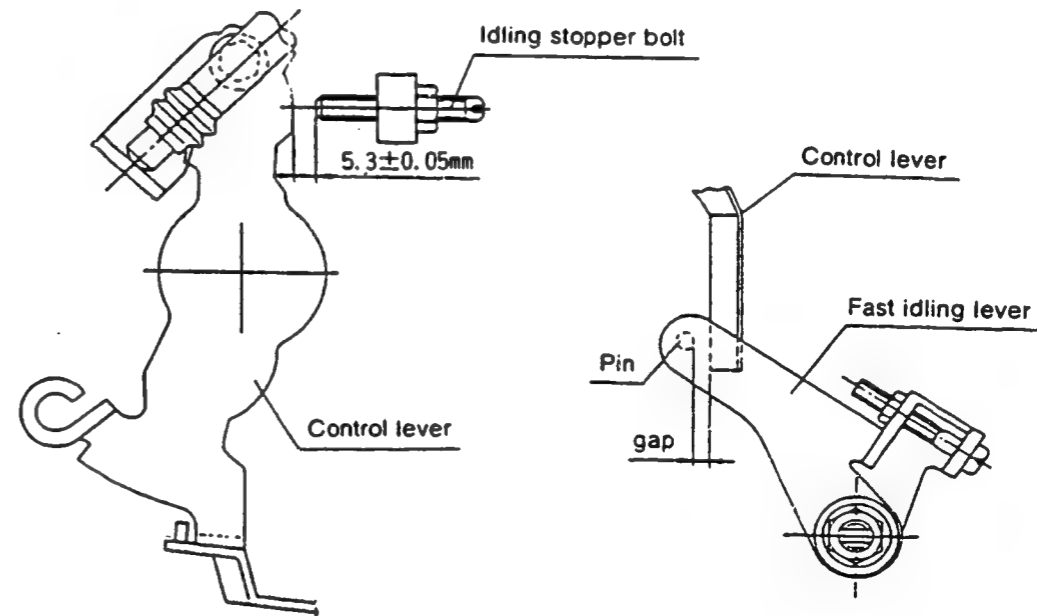


Fig 1

104749-3050 5/5

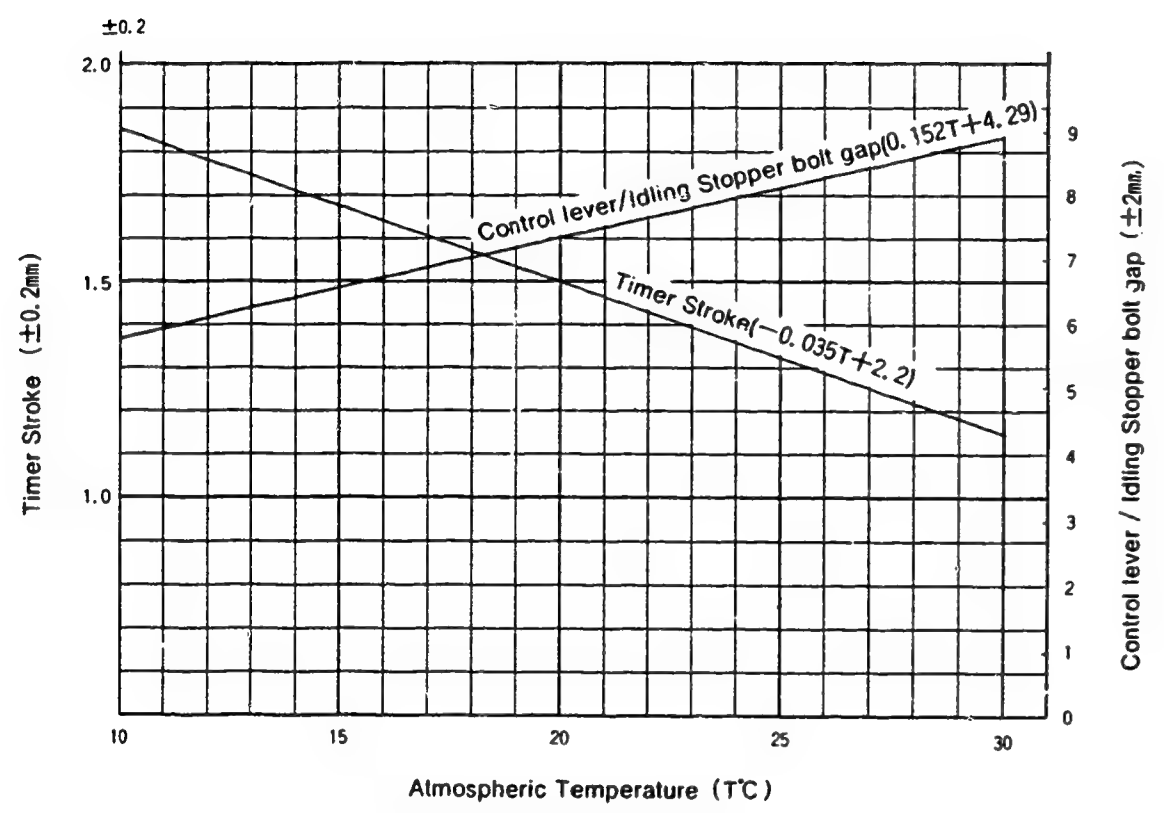


Fig 2

**INJ. PUMP CALIBRATION DATA**

**Distributor-type**

ENGINE MODEL : 4D65

TEST OIL:  
ISO 4113 or  
SAE J967d

BOSCH No.9 460 610 225 1/5  
DKKC No. 104749-3060  
Date : 30.May.1987   
Company : MITSUBISHI  
No. MD104233

104749-3060 2/5

Injection pump No: 104649-3050 [NP-VE4/9F2250RNP421]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : — mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=4.6~ 5.0 (mm)		
1-2 Supply pump pressure	1,250	4.5~ 6.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,250	37.2~38.2 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	375	5.0~ 8.0 (cc/1,000st)		2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,750	7.6~13.6 (cc/1,000st)		2.0
1-7 Load-timer adjustment	1,250	T-0.5± 0.2 (mm)		
1-8				

2. Test Specifications		Solenoïd timer		OFF			ON				
2-1 Timing device	N = rpm mm	400	600	1,250	1,750	2,250	0.5~ 1.7	1.5~ 2.7	4.4~ 5.2	6.3~ 7.5	8.7~ 9.9
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	600	1,250	2,250			2.9~ 3.5	4.5~ 5.1	6.8~ 7.4		
2-3 Overflow delivery	N = rpm cc/10s	1,250					48.0~92.0				
2-4 Fuel injection quantities		Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)					
		Full speed position	1,250	36.7~38.7							
			600	31.7~35.7							
			750	32.2~36.2							
			1,750	35.7~39.7							
			2,250	33.2~37.2							
			2,750	5.6~15.6							
			3,000	Below 3.0							
		Switch OFF	375	0							
		Idling position	600	Below 3.0							
			375	4.5~ 8.5							
2-5 Solenoïd		Max.cut-in voltage : 8 V									
		Test voltage : 12~14 V									

**3. Dimensions**

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.3~1.5	mm
BCS	—	mm

**Control lever angle**

α	55.0~63.0	deg
A	10.5~16.0	mm
β	36.0~46.0	deg
B	10.5~15.0	mm
γ	—	deg
C	—	mm

**LOAD TIMER ADJUSTMENT**

1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 24.6±1 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1/7)

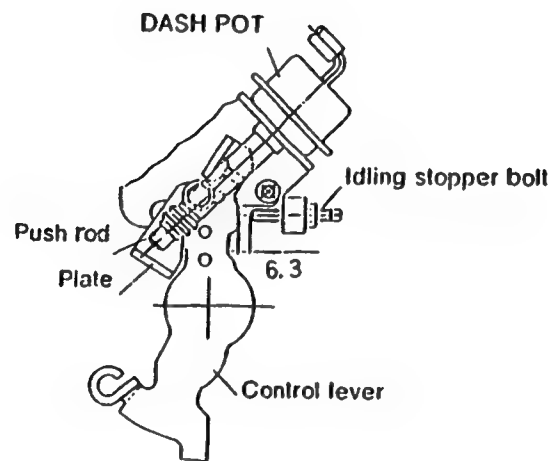
2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	23.1~26.1	0	(4.3)	0.1~0.9
1250	11.6~14.6	0	(3.0~4.2)	0.6~1.8

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $6.3 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $10^\circ \pm 2^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

1) Timer Stroke Adjustment (Refer to Fig 1.2)

- ① Using the graph (Fig 2) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

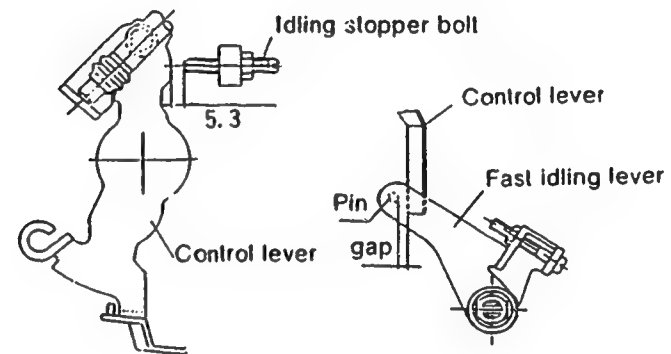


Fig. 1

104749-3060 5/5

2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

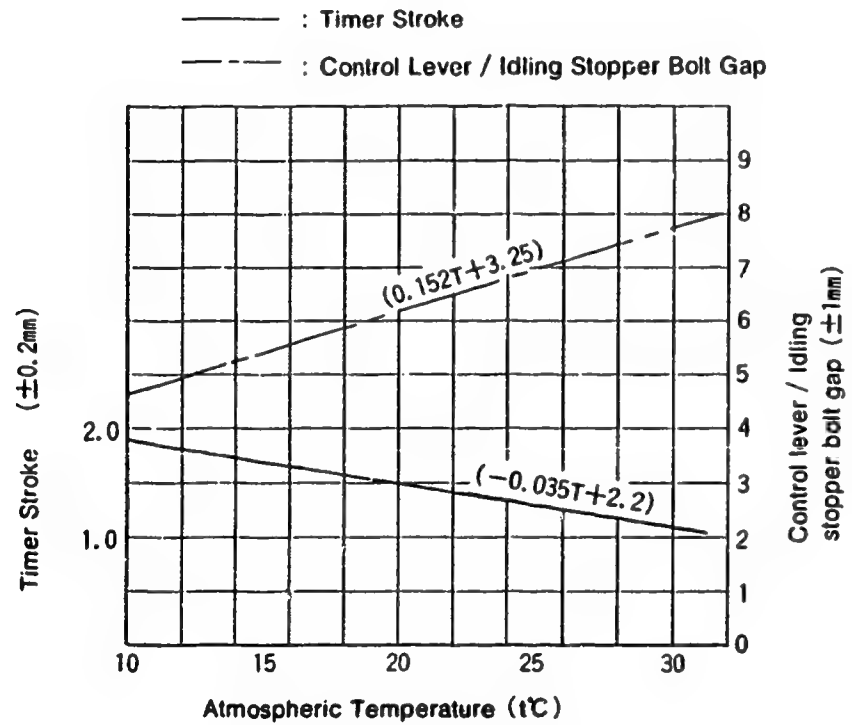


Fig. 2

## INJ. PUMP CALIBRATION DATA

### Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : 4D65

BOSCH No.9 460 610 247 1/5

DKKC No. 104749-3080

Date : 30.May.1987 Q

Company : MITSUBISHI

No. MD113131

104749-3080 2/5

Injection pump No: 104649-3050 [NP-VE4/9F2250RNP421]

Pump rotation : clockwise-viewed from drive side

For Test Condition see  
Microfiche No.WP-210(N16)

Pre-stroke : — mm

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=4.6~ 5.0 (mm)		
1-2 Supply pump pressure	1,250	4.5~ 6.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,250 †	37.2~38.2 (cc/1,000st)		3.0
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	375	5.0~ 8.0 (cc/1,000st)		2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,750	7.6~13.6 (cc/1,000st)		2.0
1-7 Load-timer adjustment	1,250	T-0.5± 0.2 (mm)		
1-8				

2. Test Specifications		Solenoid timer	OFF			ON	
2-1	Timing device	N = rpm mm	400 0.5~ 1.7	600 1.5~ 2.7	1,250 4.4~ 5.2	1,750 6.3~ 7.5	2,250 8.7~ 9.9
2-2	Supply pump	N = rpm kg/cm <sup>2</sup>	600 2.9~ 3.5	1,250 4.5~ 5.1	2,250 6.8~ 7.4		
2-3	Overflow delivery	N = rpm cc/10s	1,250 48.0~92.0				
2-4	Fuel injection quantities						
	Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)		
	Full speed position	1,250	36.7~38.7				
		600	31.7~35.7				
		750	32.2~36.2				
		1,750	35.7~39.7				
		2,250	33.2~37.2				
		2,750	5.6~15.6				
		3,000	Below 3.0				
	Switch OFF	375	0				
	Idling position	600	Below 3.0				
		375	4.5~ 8.5				
2-5	Solenoid	Max.cut-in voltage : 8 V		Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.3~1.5	mm
BCS	—	mm

#### Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	36.0~46.0	deg
B	10.5~15.0	mm
γ	—	deg
C	—	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 24.6±1 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1 / 7)

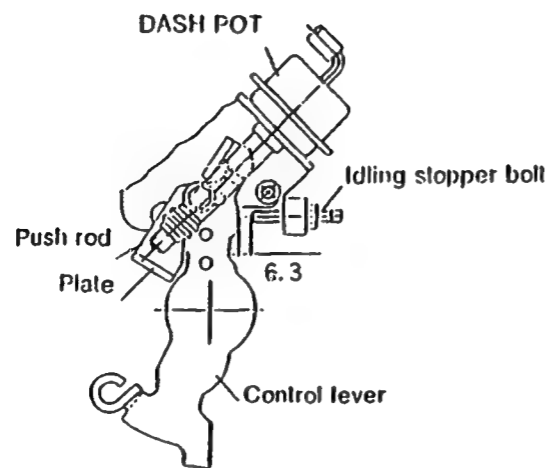
#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	23.1~26.1	0	(4.3)	0.1~0.9
1250	11.6~14.6	0	(3.0~4.2)	0.6~1.8

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $6.3 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $10^\circ \pm 2^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

1) Timer Stroke Adjustment (Refer to Fig 1.2)

- ① Using the graph (Fig 2) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

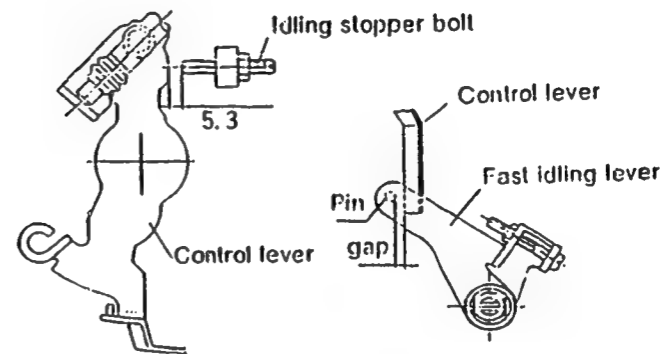


Fig. 1

104749-3080 5/5

2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

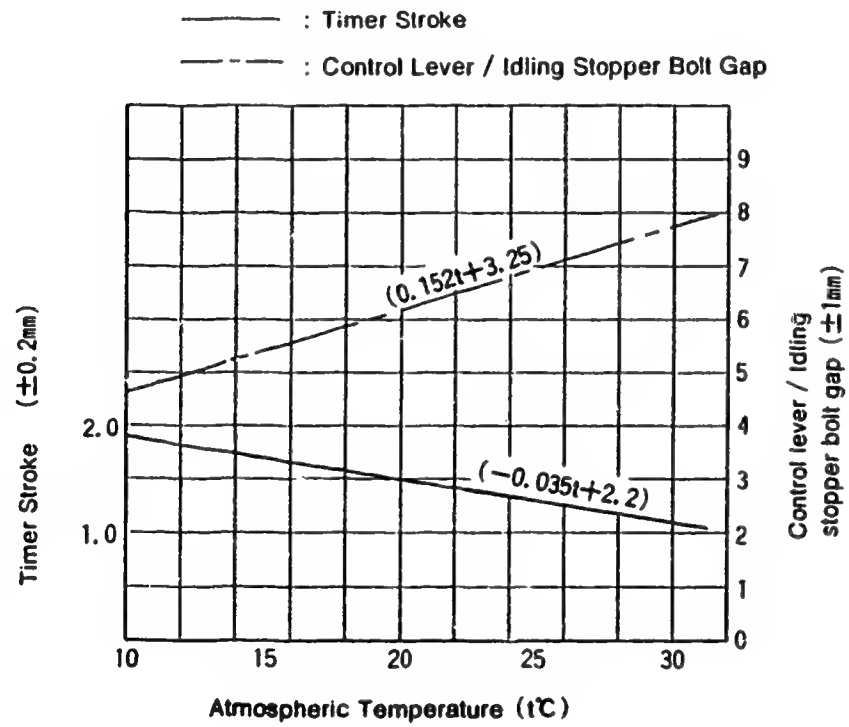


Fig. 2



## INJ. PUMP CALIBRATION DATA Distributor-type

TEST OIL:  
I S O 4113 or  
S A E J967d

ENGINE MODEL : 4D65T

Injection pump No: 104649--3060 [NP-VE4/9F2250RNP422]

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

BOSCH No.9 460 610 226 1/5

DKKC No. 104749-3090

Date : 30.May.1987 0

Company : MITSUBISHI

No. MD104234

For Test Condition see  
Microlche No.WP-210(N16)

104749-3090 2/5

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.9~ 4.3 (mm)	580~600	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	580~600	
1-3 Full load delivery without charge air pressure	1,250	46.3~47.3 (cc/1,000st)	580~600	3.5
Full load delivery with charge air pressure	750	40.2~41.2 (cc/1,000st)	240~260	3.0
1-4 Idle speed regulation	400	5.0~ 8.0 (cc/1,000st)	0	2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,750	3.5~9.5 (cc/1,000st)	0	
1-7 Load-timer adjustment	1,250	T-0.6± 0.2 (mm)	0	
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	600	1,250	2,250	
	mm	0.7~ 1.9	3.7~ 4.5	7.8~ 8.6	
2-2 Supply pump	N = rpm	600	1,250	2,250	
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.8~ 7.4	
2-3 Overflow delivery	N = rpm	1,250			
	cc/10s	48.0~92.0			
2-4 Fuel injection quantities					
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)	
Full speed position	1,250	45.8~47.8	580~600		
	600	32.7~37.7	0		
	750	39.7~41.7	240~260		
	2,250	38.2~43.2	580~600		
	2,750	1.5~11.5	0		
	3,000	Below 3.0	0		
Switch OFF	400	0	0		
Idling position	600	Below 2.0	0		
	400	4.5~ 8.5	0		
2-5 Solenoid					
Max.cut-in voltage : 8 V					
Test voltage : 12~14 V					

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.5~3.7	mm

#### Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	38.0~44.0	deg
B	11.5~14.1	mm
γ	—	deg
C	—	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

- ① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 33.2±1 cc/1000st  
Quantity

- ② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1/7)

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	32.2~34.2	0	(3.5)	0.2~1.0
1250	24.2~26.2	0	(2.3~3.5)	(1.2)

## INJ. PUMP CALIBRATION DATA

### Distributor-type

ENGINE MODEL : 4D65T

TEST OIL:  
ISO 4113 or  
SAE J967d

Injection pump No: 104649-3060 (NP-VE4/9F2250RNP422)

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

BOSCH No.9 460 610 227 1/5

DKKC No. 104749-3100

Date : 30.May.1987 (0)

Company : MITSUBISHI

No. MD104235

For Test Condition see  
Microfiche No.WP-210(N16)

104749-3100 2/5

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.9~ 4.3 (mm)	580~600	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	580~600	
1-3 Full load delivery with charge air pressure	1,250	46.3~47.3 (cc/1,000st)	580~600	3.5
Full load delivery with charge air pressure	750	40.2~41.2 (cc/1,000st)	240~260	3.0
1-4 Idle speed regulation	400	5.0~ 8.0 (cc/1,000st)	0	2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,750	3.5~9.5 (cc/1,000st)	0	
1-7 Load-timer adjustment	1,250	T-0.6± 0.2 (mm)	0	
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	600	1,250	2,250
	mm	0.7~ 1.9	3.7~ 4.5	7.8~ 8.6
2-2 Supply pump	N = rpm	600	1,250	2,250
	kg/cm <sup>2</sup>	2.9~ 3.5	4.5~ 5.1	6.8~ 7.4
2-3 Overflow delivery	N = rpm	1,250		
	cc/10s	48.0~92.0		
2-4 Fuel injection quantities				
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	45.8~47.8	580~600	
	600	32.7~37.7	0	
	750	39.7~41.7	240~260	
	2,250	38.2~43.2	580~600	
	2,750	1.5~11.5	0	
3,000	Below 3.0	0		
Switch OFF	400	0	0	
Idling position	600	Below 2.0	0	
	400	4.5~ 8.5	0	
2-5				
Solencid	Max.cut-in voltage : 8 V	Test voltage : 12~14 V		

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.5~3.7	mm

#### Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	38.0~44.0	deg
B	11.5~14.1	mm
γ	—	deg
C	—	mm

### LOAD TIMER ADJUSTMENT

#### 1) Adjustment

- ① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg  
Pump Speed : 1250 rpm  
Fuel Injection : 33.2±1 cc/1000st  
Quantity

- ② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1/7)

#### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

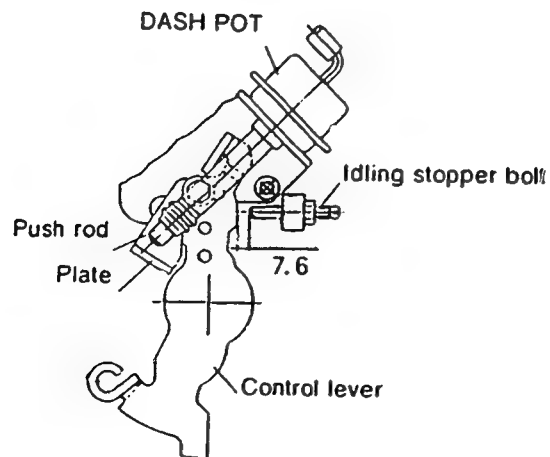
Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer siroke reduction value (mm)
1250	32.2~34.2	0	(3.5)	0.2~1.0
1250	24.2~26.2	0	(2.3~3.5)	(1.2)

○ Note

- ① At a pump speed of 1250 rpm and boost pressure of 590 mmHg, adjust the Full Load injection quantity after confirming the boost compensator stopper's full stroke.
- ② At a pump speed of 750 rpm and boost pressure of 250 mmHg, adjust the full load fuel injection quantity ( 40.2 ~ 41.2 cc/1000st) using the BCS spring set screw.

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $7.6 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $12^\circ \pm 2^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

! ) Timer Stroke Adjustment (Refer to Fig 1.2)

- ① Using the graph (Fig 2) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

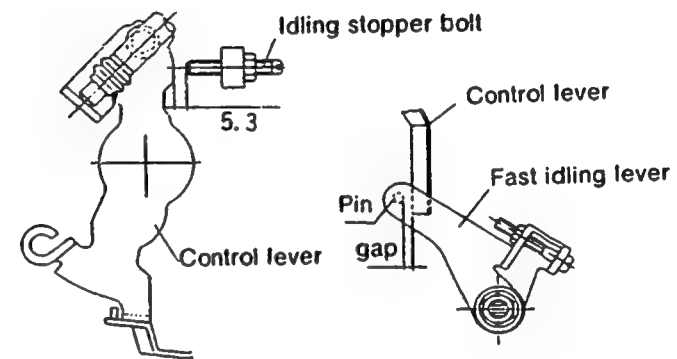


Fig. 1

104749-3100 5/5

## 2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

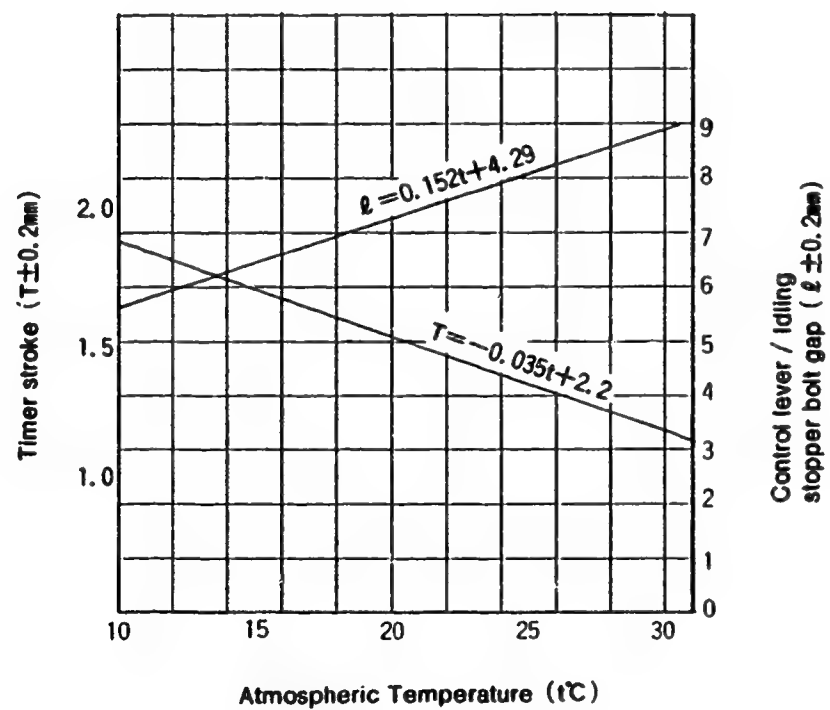


Fig. 2

# INJ. PUMP CALIBRATION DATA

## Distributor-type

ENGINE MODEL : 4D65T

BOSCH No.9 460 610 228 1/6

DKKC No. 104749-3110

Date : 30.May.1987

Company : MITSUBISHI

No. MD104236

104749-3110 2/6

TEST OIL:  
ISO 4113 or  
SAE J967d

Injection pump No: 104649--3070 (NP-VE4/9F2250RNP423)

Pump rotation : clockwise-viewed from drive side

Pre-stroke : - mm

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,250	T=3.9~ 4.3 (mm)	580~600	
1-2 Supply pump pressure	1,250	4.5~ 5.1 (kg/cm <sup>2</sup> )	580~600	
1-3 Full load delivery with charge air pressure	1,250	46.3~47.3 (cc/1,000st)	580~600	3.5
Full load delivery with charge air pressure	750	40.2~41.2 (cc/1,000st)	240~260	3.0
1-4 Idle speed regulation	400	5.0~ 8.0 (cc/1,000st)	0	2.0
1-5 Start	100	43.0~63.0 (cc/1,000st)	0	
1-6 Full-load speed regulation	2,750	3.5~9.5 (cc/1,000st)	0	
1-7 Load-timer adjustment	1,250	T-0.6± 0.2 (mm)	0	
1-8				

## 2. Test Specifications

2-1 Timing device	N = rpm mm	600 0.7~ 1.9	1,250 3.7~ 4.5	2,250 7.8~ 8.6
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	600 2.9~ 3.5	1,250 4.5~ 5.1	2,250 6.8~ 7.4
2-3 Overflow delivery	N = rpm cc/10s	1,250 48.0~92.0		

### 2-4 Fuel injection quantities

Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)
Full speed position	1,250	45.8~47.8	580~600	
	600	32.7~37.7	0	
	750	39.7~41.7	240~260	
	2,250	38.2~43.2	580~600	
	2,750	1.5~11.5	0	
	3,000	Below 3.0	0	

Switch OFF	400	0	0	
Idling position	600	Below 2.0	0	
	400	4.5~ 8.5	0	

2-5 Solenoid Max.cut-in voltage : 8 V  
Test voltage : 12~14 V

## 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	0.9~1.1	mm
BCS	3.5~3.7	mm

### Control lever angle

α	55.0~63.0	deg
A	10.5~16.0	mm
β	38.0~44.0	deg
B	11.5~14.1	mm
γ	—	deg
C	—	mm

○ Note

① At a pump speed of 1250 rpm and boost pressure of 590 mmHg, adjust the Full Load injection quantity after confirming the boost compensator stoppre's full stroke.

② At a pump speed of 750 rpm and boost pressure of 250 mmHg, adjust the full load fuel injection quantity ( 40.2 ~ 41.2 cc/1000st) using the BCS spring set screw.

## LOAD TIMER ADJUSTMENT

### 1) Adjustment

① Fix the control lever in the position satisfying the following conditions.

Boost Pressure : 0 mmHg

Pump Speed : 1250 rpm

Fuel Injection : 33.2±1 cc/1000st  
Quantity

② With the control lever positioned as described in ① above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1 / 7)

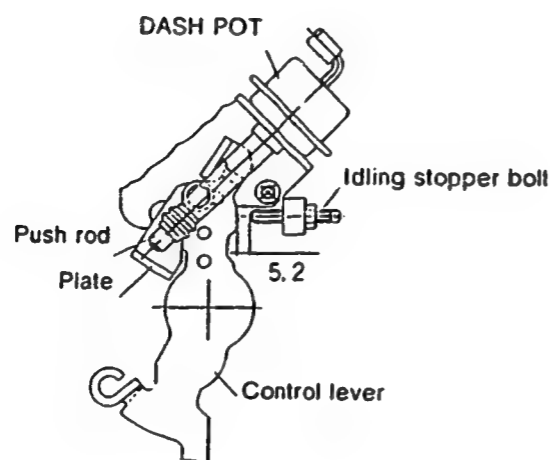
### 2) Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified Values	
Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	32.2~34.2	0	(3.5)	0.2~1.0
1250	24.2~26.2	0	(2.3~3.5)	(1.2)

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $5.2 \pm 1$  in the gap between the control lever and the idling stopper bolt.  
(control lever angle :  $8^\circ \pm 2^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

- 1) Timer Stroke Adjustment (Refer to Fig 1.2)
  - ① Using the graph (Fig 2) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
  - ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

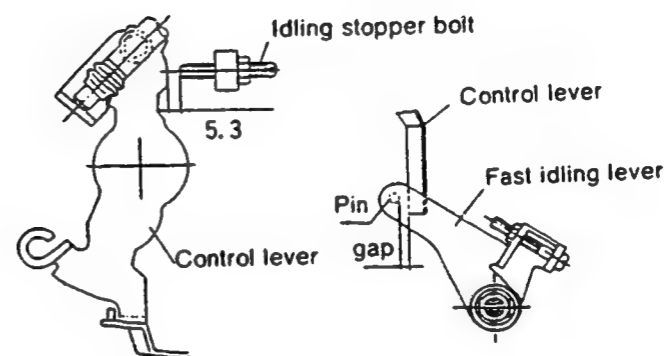


Fig. 1

2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

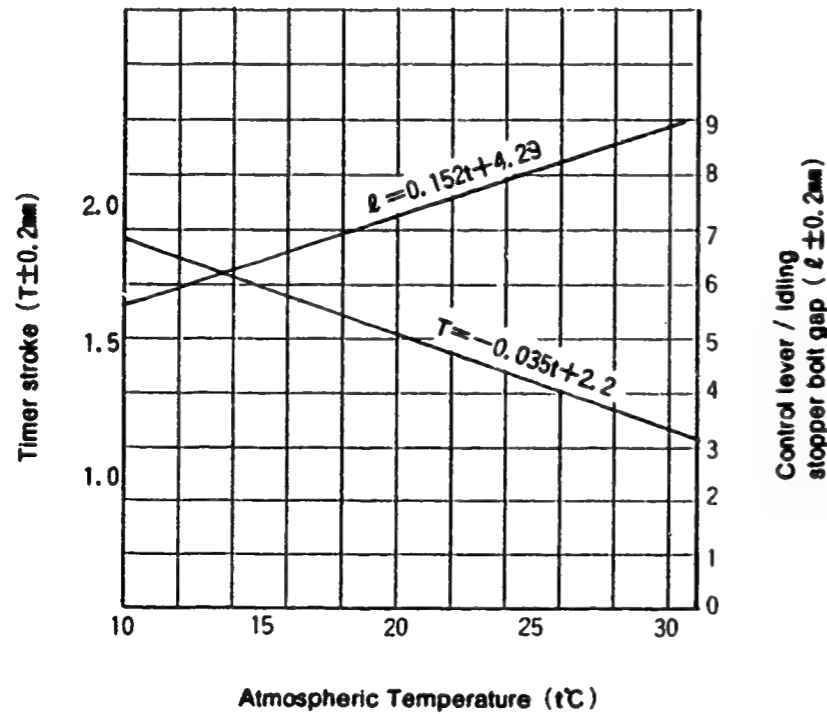


Fig. 2

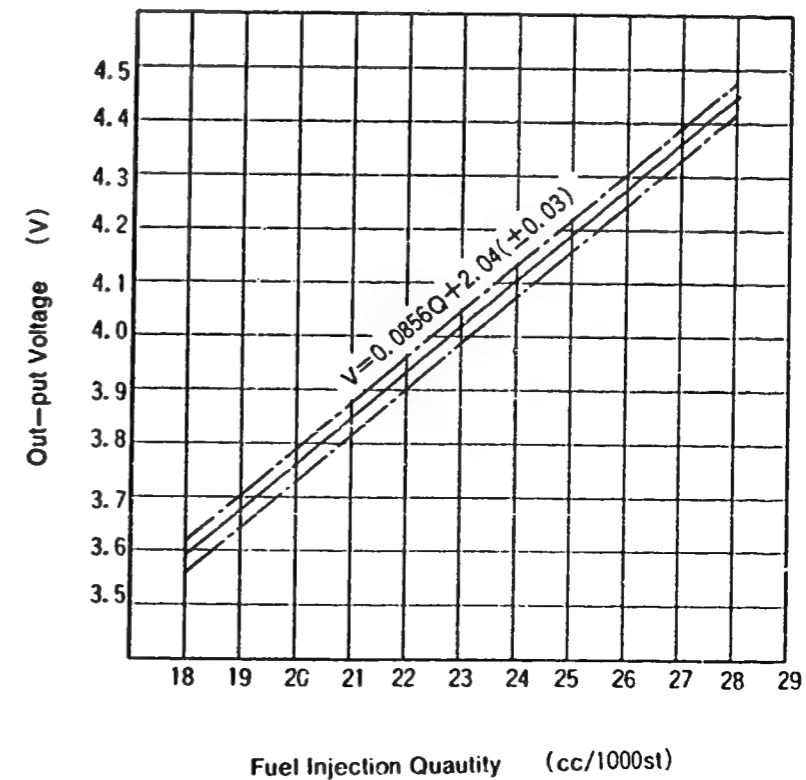
■ POTENTIOMETER ADJUSTMENT

Under the following conditions, after potentiometer installation position so that the out-put voltage equale the specified value.

Adjustment Conditions			Specified Value	Remarks
Control lever position	Pump speed (rpm)	Fuel Injection Quantity(cc/1000st)	Adjustment Value Out-put voltage (V)	
(Approx 19°)	1000	22.9	$4 \pm 0.03$	Adjusting point
Idel	—	—	$0.8 \pm 0.7$	Check point
Full speed	—	—	$7.7 \pm 1.2$	Check point

(In-put Voltage:10V)

\* A control lever position of approximately 19°, means that a block gauge of 12.1 mm thickness is inserted between the control lever and the idling stopper bolt.



## INJ. PUMP CALIBRATION DATA

### Distributor-type

TEST OIL:  
ISO 4113 or  
SAE J967d

ENGINE MODEL : SD22

Injection pump No: 104649-4111 (NP-VE4/9F2000RNP68)

Pump rotation : clockwise-viewed from drive side

Pre-stroke : 0.08~0.12 mm

BOSCH No.9 460 610 248

DKKC No. 104749-4151

Date : 30.May.1987 0

Company : NISSAN DIESEL

No. 16700 R8118

For Test Condition see  
Microfiche No.WP-210(N16)

1. Setting	Pump speed (rpm)	Settings	Charge air press(mmHg)	Difference in delivery(cc)
1-1 Timing device travel	1,000	2.1~ 2.5 (mm)		
1-2 Supply pump pressure	1,000	3.7~ 4.3 (kg/cm <sup>2</sup> )		
1-3 Full load delivery without charge air pressure	1,000	28.9~29.9 (cc/1,000st)		2.5
Full load delivery with charge air pressure		(cc/1,000st)		
1-4 Idle speed regulation	300	4.3~ 8.3 (cc/1,000st)		2.0
1-5 Start	100	Above 42.0 (cc/1,000st)		
1-6 Full-load speed regulation	2,100	18.0~24.0 (cc/1,000st)		
1-7				
1-8				

### 2. Test Specifications

2-1 Timing device	N = rpm	1,000	1,400	1,900	
	mm	2.0~ 2.6	3.6~ 4.8	6.2~ 7.1	
2-2 Supply pump	N = rpm	500	1,000	1,900	
	kg/cm <sup>2</sup>	2.0~ 2.6	3.7~ 4.3	6.6~ 7.2	
2-3 Overflow delivery	N = rpm	1,000			
	cc/10s	42.0~85.0			
2-4 Fuel injection quantities					
Speed control lever position	Pump speed (rpm)	Fuel delivery (cc/1,000st)	Charge air press(mmHg)	Difference in delivery(cc)	
Full speed position	1,000	28.4~30.4			
	600	23.8~27.8			
	1,400	30.1~34.1			
	2,000	28.5~32.7			
	2,100	17.5~24.5			
	2,300	Below 5.0			
Switch OFF	300	0			
Idling position	300	4.3~ 8.3			
	400	Below 3.0			
2-5 Solenoid		Max.cut-in voltage : 8 V			
		Test voltage : 12~14 V			

### 3. Dimensions

K	3.2~3.4	mm
KF	5.7~5.9	mm
MS	1.4~1.6	mm
BCS	—	mm

#### Control lever angle

α	21.0~29.0	deg
A	2.5~ 7.7	mm
β	37.0~47.0	deg
B	10.7~14.8	mm
γ	—	deg
C	—	mm

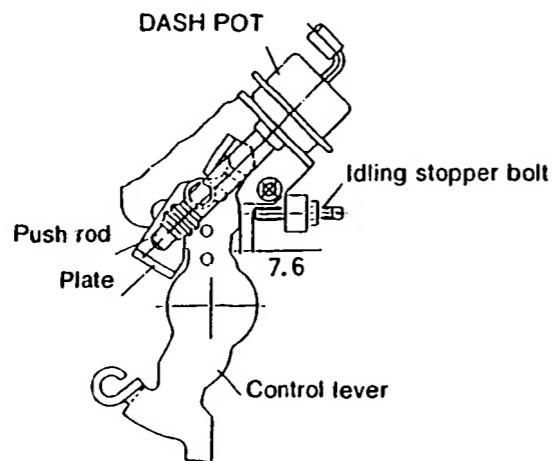


○ Note

- ① At a pump speed of 1250 rpm and boost pressure of 590 mmHg, adjust the Full Load injection quantity after confirming the boost compensator stoppre's full stroke.
- ② At a pump speed of 750 rpm and boost pressure of 250 mmHg, adjust the full load fuel injection quantity ( 40.2 ~ 41.2 cc/1000st) using the BCS spring set screw.

■ DASH POT ADJUSTMENT

- ① Insert a block gauge (thickness gauge) of thickness  $7.6 \pm 1$  in the gap between the control lever and the idling stopper bolt. (control lever angle :  $12^\circ \pm 2^\circ$  )
- ② With the control lever positioned as described in ① above, adjust the plate position so that the control lever plate and the dash pot push rod are in contact.



■ W-CSD ADJUSTMENT

1) Timer Stroke Adjustment (Refer to Fig 1.2)

- ① Using the graph (Fig 2) , determine the Timer Stroke according to the atmospheric temperature at the time of adjustment.
- ② Adjust using the Timer Stroke adjusting bolt so that the Timer Stroke corresponds to the value determined in note ① above.

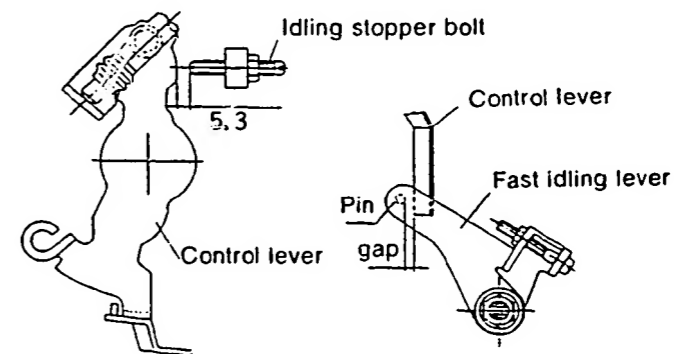


Fig. 1

104749-3090 5/5

2) Fast Idle Adjustment (Refer to Fig 1.2)

- ① Insert a block gauge of  $5.3 \pm 0.05$  mm thickness in the gap between the control lever and the idling stopper bolt.
- ② From Fig 2 determine the dimension of the gap between the idling lever pin and the control lever according to the atmospheric temperature at the time of adjustment.
- ③ Adjust using the fast idle adjusting screw so that the gap corresponds to the value determined in note 2) ② above.

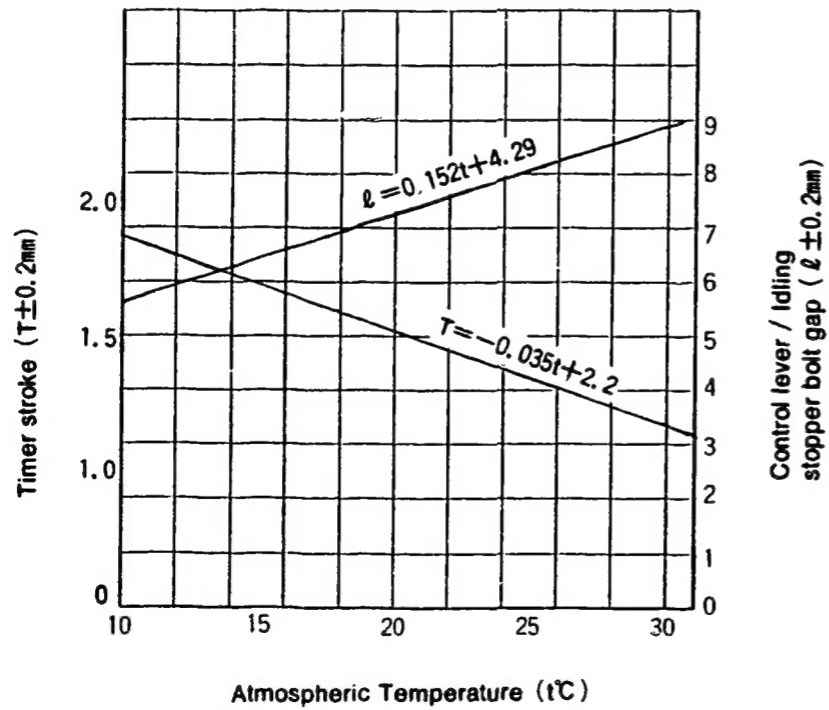


Fig. 2

**Table of Contents (DKKC No. —→ BOSCH No.)**

**Table of Contents (BOSCH No. —→ DKKC No.)**

DKKC No.	BOSCH No.	Location	DKKC No.	BOSCH No.	Location
101401-1121	9 400 610 056	WP-214 B- 1 ~B- 3	104749-3110	9 460 610 228	WP-214 G- 4 ~G- 6
101401-1150	9 400 610 057	WP-214 B- 4 ~B- 7	104749-4151	9 460 610 248	WP-214 G- 7
101401-1220	9 400 610 058	WP-214 B- 8 ~B-10			
101401-1230	9 400 610 059	WP-214 B-11~B-14			
101601-9931	9 400 610 055	WP-214 C- 1 ~C- 3			
101631-9774	9 400 610 060	WP-214 C- 4 ~C- 5			
101641-9214	9 400 610 061	WP-214 C- 6 ~C- 8			
104740-3670	9 460 610 234	WP-214 D- 1 ~D- 2			
104740-3680	9 460 610 235	WP-214 D- 3			
104740-3700	9 460 610 236	WP-214 D- 4			
104740-3710	9 460 610 237	WP-214 D- 5			
104740-3720	9 460 610 238	WP-214 D- 6 ~D- 7			
104740-3760	9 460 610 239	WP-214 D- 8			
104740-4280	9 460 610 229	WP-214 D- 9			
104740-4630	9 460 610 224	WP-214 D- 9			
104740-4760	9 460 610 220	WP-214 D-10~D-11			
104740-9340	9 460 610 240	WP-214 D-12			
104740-9351	9 460 610 241	WP-214 D-13			
104740-9371	9 460 610 242	WP-214 D-14			
104740-9540	9 460 610 243	WP-214 D-15~D-16			
104748-0244	9 460 610 193	WP-214 E- 1 ~E- 3			
104748-2340	9 460 610 244	WP-214 E- 4			
104749-0293	9 460 610 223	WP-214 E- 7 ~E- 8			
104749-0322	9 460 610 245	WP-214 E- 9 ~E-10			
104749-0332	9 460 610 246	WP-214 E-11~E-12			
104749-1131	9 460 610 221	WP-214 E-13			
104749-2191	9 460 610 249	WP-214 E-14~E-16			
104749-3031	9 460 610 197	WP-214 F- 1 ~F- 3			
104749-3050	9 460 610 219	WP-214 F- 4 ~F- 6			
104749-3060	9 460 610 225	WP-214 F- 7 ~F- 9			
104749-3080	9 460 610 247	WP-214 F-10~F-12			
104749-3090	9 460 610 226	WP-214 F-13~F-14			
104749-3100	9 460 610 227	WP-214 G- 1 ~G- 3			

BOSCH No.	DKKC No.	Location	BOSCH No.	DKKC No.	Location
9 400 610 055	101601-9931	WP-214 C- 1 ~C- 3	9 460 610 248	104749-4151	WP-214 G- 7
9 400 610 056	101401-1121	WP-214 B- 1 ~B- 3	9 460 610 249	104749-2191	WP-214 E-14~E-16
9 400 610 057	101401-1150	WP-214 B- 4 ~B- 7			
9 400 610 058	101401-1220	WP-214 B- 8 ~B-10			
9 400 610 059	101401-1230	WP-214 B-11~B-14			
9 400 610 060	101631-9774	WP-214 C- 4 ~C- 5			
9 400 610 061	101641-9214	WP-214 C- 6 ~C- 8			
9 460 610 193	104748-0244	WP-214 E- 1 ~E- 3			
9 460 610 197	104749-3031	WP-214 F- 1 ~F- 3			
9 460 610 219	104749-3050	WP-214 F- 4 ~F- 6			
9 460 610 220	104740-4760	WP-214 D-10~D-11			
9 460 610 221	104749-1131	WP-214 E-13			
9 460 610 223	104749-0293	WP-214 E- 7 ~E- 8			
9 460 610 224	104740-4630	WP-214 D- 9			
9 460 610 225	104749-3060	WP-214 F- 7 ~F- 9			
9 460 610 226	104749-3090	WP-214 F-13~F-14			
9 460 610 227	104749-3100	WP-214 G- 1 ~G- 3			
9 460 610 228	104749-3110	WP-214 G- 4 ~G- 6			
9 460 610 229	104740-4280	WP-214 D- 9			
9 460 610 234	104740-3670	WP-214 D- 1 ~D- 2			
9 460 610 235	104740-3680	WP-214 D- 3			
9 460 610 236	104740-3700	WP-214 D- 4			
9 460 610 237	104740-3710	WP-214 D- 5			
9 460 610 238	104740-3720	WP-214 D- 6 ~D- 7			
9 460 610 239	104740-3760	WP-214 D- 8			
9 460 610 240	104740-9340	WP-214 D-12			
9 460 610 241	104740-9351	WP-214 D-13			
9 460 610 242	104740-9371	WP-214 D-14			
9 460 610 243	104740-9540	WP-214 D-15~D-16			
9 460 610 244	104748-2340	WP-214 E- 4			
9 460 610 245	104749-0322	WP-214 E- 9 ~E-10			
9 460 610 246	104749-0332	WP-214 E-11~E-12			
9 460 610 247	104749-3080	WP-214 F-10~F-12			